Unit (3) Energy and Fuel

Concept (3.1) Devices and Energy

Key vocabulary

Chemical energy	الطاقة الكيميائية	Energy transfer	نقل الطاقة
Earth	الأرض	Sound	صوت
Energy resource	مصدر طاقة	Sun	الشمس
Energy conservation	الحفاظ على الطاقة		

Activity -1

Energy *can be changed from one form to another.* الطاقة يمكن تغيير من شكل إلى آخر

• *Different devices can help us convert the light energy that comes from the sun into different forms of energy.*

• الأجهزة المختلفة يمكن أن تساعدنا في تحول الطاقة الضوئية التي تأتي من الشمس إلى أشكال مختلفة من الطاقة.

• **Now**, most devices depend on electricity, and to generate electricity, we can convert the energy of the Sun in different ways.

• الآن ، تعتمد معظم الأجهزة على الكهرباء ، ولتوليد الكهرباء يمكننا تحويل طاقة الشمس بطرق مختلفة.

Activity 2 Energy in Remote-Controlled Cars

In which picture, can the child move the car remotely (   )



Picture (1) Picture (2)

Energy in remote-controlled cars

الطاقة في السيارات التي يتم التحكم فيها عن بعد

• Many toys such as cars, trucks, planes, and boats may be operated remotely.

• يمكن تشغيل العديد من الألعاب مثل السيارات والشاحنات والطائرات والقوارب عن بعد.

All toys need energy to move forward or backward remotely.

كل الألعاب تحتاج إلى طاقة للتحرك للأمام أو للخلف عن بُعد.

How do those toys get energy?

Batteries inside these toys are the resource of **chemical energy** and this energy is **converted** into **electrical energy**

Electrical energy is converted into **kinetic energy** or **sound** energy.

كيف تحصل هذه الألعاب على الطاقة؟ البطاريات الموجودة داخل هذه الألعاب هي مصدر الطاقة الكيميائية ويتم تحويل هذه الطاقة إلى طاقة كهربائية ـ الطاقة الكهربائية يتم تحويلها إلى طاقة حركية أو طاقة صوتية

But, what do we do when the batteries of these toys run out ?

Batteries can be **recharged** by connecting the device to a nearby charger. or by **replacing** the old batteries with new ones.

لكن ماذا نفعل عندما تنفد بطاريات هذه الألعاب؟
يمكن إعادة شحن البطاريات عن طريق توصيل الجهاز بشاحن قريب. أو باستبدال البطاريات القديمة بأخرى جديدة.

Check your understanding Complete the following sentences using the words below : (kinetic - chemical - electrical)

1. The energy stored in batteries is…………. energy
2. In batteries of remote-controlled toy, chemical energy is converted into …………. energy . which converted into …………. energy or sound energy



Activity 3
Mars Rover

Mars exploration rover استكشاف المريخ

Mars is **54 million** kilometers from Earth, the spacecraft will take about **6 months** to go that distance

يبعد المريخ حوالي 54 مليون كيلومتر عن الأرض ، لذا ستستغرق المركبة الفضائية حوالي 6 أشهر لتقطع تلك المسافة

, all these missions had remotely operated vehicles or robots

كانت جميع هذه المهمات مزودة بمركبات أو روبوتات تعمل عن بعد ،

• The "Mars rover Curiosity" which travels on the surface Mars, is one of the most (robots)

• تعتبر "مركبة المريخ كيوريوسيتي" التي تسافر على سطح المريخ واحدة من الروبوتات

• These robots. like remote-controlled toys, require energy to be operated, but the batteries used in the toys cannot be used in these robots as they are too distance

هذه الروبوتات. مثل الألعاب التي يتم التحكم فيها عن بعد ، تتطلب طاقة لتشغيلها ، لكن البطاريات المستخدمة في الألعاب لا يمكن استخدامها في هذه الروبوتات لأنها بعيدة جدًا

The Curiosity exploration rover uses solar panels and batteries (which are charge by solar energy) as a resource of energy,

تستخدم مركبة كيوريوسيتي الاستكشافية الألواح الشمسية والبطاريات (التي يتم شحنها بواسطة الطاقة الشمسية) كمصدر للطاقة

The solar panels on the rover convert **solar energy** into **electrical energy**, which used charge the rover's batteries.

، الألواح الشمسية الموجودة في العربة الجوالة تقوم بتحويل الطاقة الشمسية إلى طاقة كهربائية ، والتي تستخدم شحن بطاريات العربة الجوالة.

- **The electrical energy** from the **batteries powers** the vehicle's sensors and the electrical energy vehicle moves across Mars surface. also transformed into kinetic energy and thermal energy

تعمل الطاقة الكهربائية من البطاريات على تشغيل مستشعرات السيارة وتتحرك مركبة الطاقة الكهربائية عبر سطح المريخ. تحولت أيضًا إلى طاقة حركية وطاقة حرارية

Unit 3 (3.1)

Exercises on Lesson (1)

1-Choose the correct answer?

1-Toy cars need energy to do all the following functions, except

.a moving forward and backward. b. rotation in a circle
c. moving right and left d. rotation around the moon.

2. In the battery of a toy car ……….energy is converted into electrical

a chemical b. sound c. light energy d. thermal

3-Electrical energy produced from a toy car battery can be converted into……….,…… …………and …………….. energies

a. mechanical-sound-solar b. mechanical-thermal-solar
c. mechanical-sound-thermal d. sound-thermal-solar

4-The energy source in a toy car is the …………….

a. engine b. tires c. battery d. fuel

5. It takes several ………….for a spacecraft to travel from Earth to Mars

a. seconds b. minutes c. days d. months

6. Curiosity rover is designed to explore

a. Earth b. Mars c. the sun d. the moon

2-Put (√) or (x)

1-Energy cannot be transformed from one form to another ( )
2-We can convert the solar energy into different forms of energy ( )
3. A toy car can continue moving even after its battery runs out ( )
4-Curiosity is a vehicle that travels across the surface of the planet Mars ( )
5-Mars is located a few meters away from Earth ( )
6-Without electrical energy, Mars rover Curiosity cannot move or communicate with Earth ( )

3-Correct the underlined words

1-The solar energy produced from the moon can be converted into different forms of energy (………………..)
2-Toy cars depend on fuel as a source of electrical energy. (…………….)
3. Curiosity is a robotic vehicle that is designed to explore the surface of moon (………………..)

3-Write the scientific term of each of the following

1-The source of energy in some toys that stores chemical energy (………….)
2. The energy produced from batteries (……………….)
3-A robotic vehicle designed to explore the surface of Mars .(……………….)

5-Complete the following sentences

1-The energy can be ……….from one form to another
2-Remote controlled toy cars converts into…………… energy stored in its batteries into ……….. energy that in turn is converted into ………. energy which is used to move the car
3-To operate an electric mixer we use……….. energy
4-When your cell phone is out of charge, you must recharge its …………to operate it again
5-Some calculators can change solar energy ....energy by using the sunlight into
6. On planet Mars, Curiosity robot is operated by using ………..energy from sunlight that is converted into ……………..energy used to recharge its batteries

6-Give reasons for

1-A remote controlled toy car needs a battery to move from one place to another

……………………………………………………………………………………………

2-Some calculators use the sunlight to operate .

……………………………………………………………………………………………

3-Mars rover Curiosity operates for a long period of time on Mars without any need to be recharged .

……………………………………………………………………………………………

6- 1- Because the chemical energy in battery is changes into electrical energy to kinetic energy that makes the car moves

2- Because (solar energy) is converted into electrical energy

3- Because Due to the presence of solar panels that use sunlight to recharge its batteries

7-What happens if…?

1-Batteries of remote-controlled toy car run out .

……………………………………………………………………………………………

2-Solar calculators were exposed to the sunlight

……………………………………………………………………………………………

7- 1- The car will not move, - we can recharge its batteries

2- Solar energy is converted into electrical energy that operate them

3- It cannot be operated, because it depends on sunlight

Lesson (2) Devices and Energy

This toy car needs energy to move



The energy used to turn the fan is electrical energy



Different devices get energy to operated

Device	Consumed energy (Input energy) الطاقة المستهلكة (طاقة الداخلة)	Produced energy (output energy) الطاقة الناتجة (طاقة الخارجة)
Hair dryer 	Electrical energy الطاقة الكهربية	thermal energy and sound energy (lost) الطاقة الحرارية والطاقة الصوتية
soap dispenser  موزع الصابون	Potential energy stored in the spring of soap dispenser الطاقة الكامنة المخزنة في سوستة موزع الصابون	kinetic energy (the movement of the soap upward). الطاقة الحركية (حركة الصابون لأعلى).
Washing machine 	Electrical energy الطاقة الكهربية	kinetic energy and sound energy(lost) الطاقة الحركية والطاقة الصوتية

Energy chain when heating a pot of water over a fire

• **Light energy** comes from the Sun causes the growth of trees

• الطاقة الضوئية التي تأتي من الشمس تسبب نمو الأشجار

• This light energy in converted into **chemical energy** which is stored in the form of sugars inside the trees

• يتم تحويل هذه الطاقة الضوئية إلى طاقة كيميائية تخزن على شكل سكريات داخل الأشجار

• When the wood of trees is burned, **thermal energy** is released which heats the water inside the pot

• عند حرق خشب الأشجار ، يتم إطلاق طاقة حرارية تسخن الماء داخل الإناء

The following diagram shows the energy chain in the previous example

Light energy From the sun → Converted into → Chemical energy Stored in trees → Converted into → Thermal energy When burning wood

طاقة ضوئية من الشمس -تتحول إلى- الطاقة الكيميائية المخزنة في الأشجار - تتحول إلى -الطاقة الحرارية عند حرق الأخشاب

Give reasons for

1. You eat food then go for a walk, there is a change of energy takes place inside your body.

Because the **chemical energy** stored in the food is converted into **kinetic energy** that helps your body **move**

1. تأكل الطعام ثم تذهب في نزهة على الأقدام ، فهناك تغير في الطاقة يحدث داخل جسمك.
لأن الطاقة الكيميائية المخزنة في الطعام تتحول إلى طاقة حركية تساعد جسمك على الحركة

2. There is a change of energy when burning some wood of trees.

Because the **chemical energy** stored inside the wood trees is converted **thermal energy**

2. هناك تغيير في الطاقة عند حرق بعض حطب الأشجار.
لأن الطاقة الكيميائية المخزنة داخل الأشجار الخشبية يتم تحويلها إلى طاقة حرارية

Energy chain in a hair dryer

• Light energy comes from the Sun causes the growth of trees

• الطاقة الضوئية التي تأتي من الشمس تسبب نمو الأشجار

Coal is produced from the remains of dead trees over millions of years so, coal is a resource of energy that stores chemical energy

يتم إنتاج الفحم من بقايا الأشجار الميتة على مدى ملايين السنين ، لذا فإن الفحم هو مصدر للطاقة يخزن الطاقة الكيميائية

Coal is used in electric power stations, because :
1. When coal is burnt, it produces thermal energy.
2. Then thermal energy is converted into kinetic energy which is used to operate certain devices in these stations in order to generate electrical energy.

يستخدم الفحم الحجري في محطات الطاقة الكهربائية وذلك للأسباب التالية: 1. عندما يتم حرق الفحم ، فإنه ينتج طاقة حرارية.
2. ثم يتم تحويل الطاقة الحرارية إلى طاقة حركية تستخدم لتشغيل أجهزة معينة في هذه المحطات لتوليد الطاقة الكهربائية.

Electrical energy goes through electric copper wires until it reaches the hair dryer to be operated

تمر الطاقة الكهربائية عبر أسلاك نحاسية كهربائية حتى تصل إلى مجفف الشعر المراد تشغيله

. The following diagram shows the energy chain in the previous example

Light energy From the sun → Converted into → Chemical energy Stored in dead trees → Converted into → Thermal energy And kinetic energy In electric power station

الطاقة الحرارية والطاقة الحركية في محطات القوى الكربية - تتحول إلى - الطاقة الكيميائية المخزنة في الأشجارالميته- تتحول إلى- طاقة ضوئية من الشمس

Electrical energy → Converted into → Thermal energy and sound energy

الطاقة الكهربية - تتحول إلى - الطاقة الحرارية والطاقة الصوتية

.

Activity 6
Energy and Everyday Devices

the following table shows the function, the energy consumed and the energy produced in some devices :

Device	Function الوظيفة	consume energy الطاقة المستهلكة	produced energy الطاقة الناتجة
Electric bulb اللمبة الكهربية	Lighting up الاضاءة	Electrical energy الطاقة الكهربية	Light energy الطاقة الضوئية thermal (lost)
Battery powered clock ساعة تعمل بالبطارية	Showing the time تظهر الوقت	Chemical energy الطاقة الكيميائية	Kinetic energy الطاقة الحركية
Flashlight الكشاف	Lighting up الاضاءة	Chemical energy الطاقة الكيميائية	Light energy and thermal Energy (lost) الطاقة الضوئية والطاقة الحرارية
Hand bell جرس يدوي	Alerting التنبية	Kinetic energy الطاقة الحركية	Sound energy الطاقة الصوتية
Electric heater سخان كهربائي	Worming التدفئة	Electrical energy الطاقة الكهربية	thermal Energy الطاقة الحرارية

Exercises on Lesson (2)

1-Choose the correct answer?

1-In the hair dryer, the electrical energy is converted into ………,……… and ………… energies

a. sound-thermal-kinetic *b kinetic-light-chemical*
c. thermal-light-chemical *d. light-sound-electrical*

2-in the washing machine the ……. energy is converted into kinetic and sound energies

a. light b. electrical c. thermal d. potential

3. You feel warm when you rub your hands together, because……… energy is converted into thermal energy

a. kinetic b. light c. electrical d. sound

4-plants can convert the light energy from the Sun into …………energy which is stored in the plant in the form of sugar

a. sound b. electrical c. chemical d. kinetic

5-When you eat an apple, your body converts the………. energy stored in the apple into ……………energy when you move

a. chemical-electrical *b. kinetic-chemical*
c. electrical-chemical *d. chemical-kinetic*

6-Electric wires are made of

a. copper b. paper c. wood d. glass

7-Which form of energy is not used or produced when you turn on an electric bulb?

a Electrical b. Light c. Thermal d. Sound

8-When you use the hand bell, the energy is converted into sound energy

a. light b. thermal c. kinetic d electric

9-Which sentence shows the correct order of energy changes in a flashlight

a. Chemical → electrical → light *b. Chemical → light → electrical*
c. Electrical → chemical → light. *d. Light → chemical → electrical*

10-If the……. energy doesn't go through the electric fan's wire, it will not turn on

a. sound b. electrical c. kinetic d. thermal

2-Put (√) or (x)

1-In the soap dispenser, potential energy is converted into kinetic energy. ( )
2. In the electric blender, sound energy is converted into electrical energy and kinetic energy ( )
3-Most of energy chains starts with the moon . ( )
4-Light energy from the Sun helps trees to grow .( )
5-Both the hair dryer and the washing machine depend on the same kind of energy to operate ( )
6-In electric power stations, sound energy produced from burning of coal is converted into electrical energy. ( )

7. There is energy waste when energy is transformed from one form to another( )
8-Energy can be destroyed inside some devices. ( )
9. The electric bulb depends on chemical energy to operate ( )
10-Both the electric bulb and the electric heater produce thermal energy .( )

3-Write the scientific term for each of the following:

1. The energy produced from a battery (…………….)
2-The energy used to operate a television. .(…………….)
3. The main source of energy for most forms of energies on Earth(………….)
4-The energy produced when the wood of trees is burned. .(…………….)
5. The substance that is produced from the remains of dead trees that buried deep in the Earth over millions of years (…………….)
6-The energy that is used to operate an electric heater .(…………….)
7-The energy stored in coal .(…………….)

4-Complete the following sentences

1-The energy produced *from the battery and used to operate a toy car is …… energy*
2-When you press on the soap dispenser………. energy stored in it spring is converted into …………energy that moves the soap upward
3-The energies that are produced from the washing machine are ………… energy and ………. energy
4-When you rub your hands together, the …….energy is converted into …… energy
5-In any energy chain, some of the energy is wasted in the form ………. .
6- The electric lamp converted electric energy into……… energy and ……. energy

5-Give reasons for

1-There is an energy change when you press the spring of a soap dispenser

…………………………………………………………………………………………………

2-When you rub your hands together, you feel warm

…………………………………………………………………………………………………

3-Not all the energy that enters the energy chain completely reaches the device

…………………………………………………………………………………………………

5- 1- Because the potential is converted into kinetic energy
2- Because the kinetic energy is converted into thermal energy.
3- Because. Because some of the energy is wasted in the form of heat

6-What happens to

1-.The change of energy when you turn on the television .

…………………………………………………………………………………

2-.The change of energy when you burn a piece of wood .

…………………………………………………………………………………………………

3-.The change of energy when you shake a small bell with your hand .3

…………………………………………………………………………………………………

.6- 1-. *The electrical energy is converted into light and sound energy*
2- *chemical energy change into thermal energy*
2- *Kinetic energy change into thermal and sound energy*

Lesson (3) The Conservation of Energy

Activity 7 Look at the then answer the

In the kettle, electrical energy is converted into thermal energy.

Yes ☐ No ☐

In the guitar, sound energy is converted into kinetic energy.

Yes ☐ No ☐

Energy can be transformed from one form to another.

Energy chain while riding a bike

When you eat, the **chemical energy** stored in the food provides your body with energy

• عندما تأكل ، تزود الطاقة الكيميائية المخزنة في الطعام جسمك بالطاقة

When you ride your bike and push the pedals, this **chemical energy** is converted into **kinetic energy**, which causes the bike to move

عندما تركب دراجتك وتضغط على الدواسات ، يتم تحويل هذه الطاقة الكيميائية إلى طاقة حركية ، مما يؤدي إلى تحرك الدراجة

Some of the **kinetic energy**, is converted into **thermal energy** due to the tyre **friction** with the **road**.:

يتم تحويل بعض الطاقة الحركية إلى طاقة حرارية بسبب احتكاك الإطارات بالطريق:

Chemical energy (in food) → Converted into → **Kinetic** energy (in the bike) → Converted into → Thermal energy (Tire friction with the road)

Energy chain when a light bulb is switched on

When you turn on a **light bulb**, the **electrical energy** that goes through the **electrical wires** is converted into **light energy**

عند تشغيل المصباح الكهربائي ، يتم تحويل الطاقة الكهربائية التي تمر عبر الأسلاك الكهربائية إلى طاقة ضوئية.

If you put your hand near the light bulb, **you can feel heat** comes out of the light bulb because some of the **electrical energy** is also converted into **thermal energy**

إذا وضعت يدك بالقرب من المصباح الكهربائي ، يمكنك أن تشعر بالحرارة تخرج من المصباح الكهربائي لأن بعض الطاقة الكهربائية تتحول أيضًا إلى طاقة حرارية

Mr.-Alifaz N. Tadrous
01005136959-/-1222978682

The following diagram shows the energy chain of the previous

From the previous examples, we can conclude that :

Energy can be changed from one form into another, where the new energy cannot be created from nothing, and the old energy does not disappear but it changes from one form of energy into another, this is called "the law of conservation of energy

من الأمثلة السابقة يمكننا أن نستنتج أن:
يمكن تغيير الطاقة من شكل إلى آخر ، حيث لا يمكن توليد الطاقة الجديدة من لا شيء ، والطاقة القديمة لا تختفي لكنها تتغير من شكل إلى آخر ، وهذا ما يسمى "قانون الحفاظ على الطاقة"

The law of conservation of energy :

Energy can neither be created nor destroyed, but only converted from one form of energy into another.

قانون حفظ الطاقة:
لا يمكن تحديث أو تدمير الطاقة ، بل يمكن تحويلها فقط من شكل واحد من أشكال الطاقة إلى شكل آخر.

3. Check your understanding

►Put (✓) or (×)

1. When you ride a bike, some of the kinetic energy is converted into thermal energy due to the friction with the road. ( )
2. Electrical energy is converted into light energy and sound energy when a light bulb is switched on. ( )
3. The food we eat contains chemical energy. ( )
4. The electrical energy that enters a fan is not destroyed, but it is converted into thermal energy. ( )

Exercises on Lesson (3)

1-Choose the correct answer?

1. In the electric water kettle, electrical energy is converted into …….energy that can warm the cold water inside it

a sound b. thermal c. light d. Kinetic

2. While playing a guitar ……….energy is converted into sound energy

a. kinetic b. light c. chemical d. potential

3. Inside a light bulb, electrical energy is converted into …………and ………. energies

a. sound-light b. sound-thermal c. kinetic-light d. light-thermal

4-When you turn on a light bulb, the electrical energy travels through …. until reaching the bulb

a. Wire b. glass c. wood d. plastic

5-Both the hair dryer and the electric water kettle produce………… energy

a. chemical b. thermal c. light d. potential

6-Some kinetic energy is converted into…….. energy due to friction of bike's tire with the road

a. light b. electrical c. potential d. thermal

2-Put (√) or (x)

1-There is a stored chemical energy inside the food we eat. ( )
2. As a result of friction between bike's tire and the road, kinetic energy is converted into chemical energy ( )
3. When pedaling a bike, the chemical energy in body is converted into kinetic energy ( )
4-Energy can't be changed from one form to another ( )

3-Write the scientific term for each of the following:

1-A form of energy produced from the electric lamp and affects our eyes (…………….)
2-Energy can neither be created nor destroyed, but only converted from one form to another (…………….)
3. The energy produced from playing guitar (…………….)
4-The energy used to play a drum .(…………….)

4- Give reasons for

1-You feel heat, when you put your hands near a lighted electric lamp

……………………………………………………………………………………………………

2-The presence of batteries inside a toy car

……………………………………………………………………………………………………

+1- Because some of the electrical energy is converted into thermal energy

2- Because battery chemical energy is converted into electrical

5-What happens if you put your hands near the lighted lamp?

You feel warm, because some electrical energy is converted into thermal energy

Lesson (4) Follow The Flow

اتبع التيار

Activity (8) Follow The Flow اتبع التيار

The law of conservation of energy, *we know that energy is conserver and is neither created nor destroyed.*

قانون الحفاظ على الطاقة ، نعلم أن الطاقة تحفظ وليست مخلوقة ولا تتلف.

• All the energy that **enters** a device must finally **come out** of it, either in **the same** form or in **other** forms.

• كل الطاقة التي تدخل الجهاز يجب أن تخرج منه أخيرًا ، إما بنفس الشكل أو بأشكال أخرى.

All devices have energy coming in and out of them, where :

- **The energy that comes in** a device is called "**input energy**".
- **The energy that comes out** a device is called "**output energy**".

جميع الأجهزة بها طاقة تدخل منها وتخرج منها ، حيث:

- الطاقة التي تأتي في الجهاز تسمى "طاقة الإدخال". - الطاقة التي يخرجها الجهاز تسمى "طاقة الاخراج"

. Energy path tracking تتبع مسار الطاقة

Device	Function الوظيفة	consume energy الطاقة المستهلكة	produced energy الطاقة الناتجة
Hair dryer مجفف الشعر	Drying hair تجفيف الشعر	Electrical energy الطاقة الكهربية	Thermal energy (produced from the hair dryer Sound energy (produced from the hair dryer) Kinetic energy (Fan movement and airflow inside the hair dryer).
mobile phone تيلفون	Ringing Lighting And producing information رنين- اضاءة وإنتاج المعلومات	Electrical energy الطاقة الكهربية In charging the mobile phone and this electrical energy stored as chemical energy	Light energy, (Light produced from the mobile phone). • Sound energy (Sound produced from the mobile phone).

Energy chain in the hair dryer

Electrical energy (in electic wire) → Converted into → **Thermal** , **Sound** **light** energy (in the hair dryer)

Energy chain in the mobile phone

Electrical energy (charging mobil) → Converted into → Chemical energy (Stored in the mobile battery) → Converted into → Sound and light energy (in the mobile phone)

Activity (9) Build an Energy Chain

- Now, we will build an energy chain that shows the flow of energy starting with input and ending with output energy

Light energy (the Sun)
Converted into
Chemical energy (Coal)
Converted into
Thermal energy and kinetic energy (Electric power station)
Converted into
Electrical energy (Electric wires)

Converted into
Kinetic energy (energy which help Blender to do its job)

Converted into
Sound energy and thermal energy (energy which don't

Converted into

Exercises on Lesson (4)

1-Choose the correct answer?

1. The input energy when using the hair dryer is the…….. energy

a. electrical   b. potential   c. kinetic   d. thermal

2-Which form of energy is not an output energy when a hair dryer is used

a. Kinetic energy   b. Electrical energy   c. Thermal energy   d. Sound energy.

3. During charging a mobile phone, the ……….energy is converted into….. energy that is stored in the phone battery.

a. electrical-chemical   b. chemical-thermal

c. electrical-thermal   d. thermal-chemical

4-Sound and ………energies are output energies when operating the mobile phone

a. electrical   b. potential   c. chemical   d. light

5-The output energy when playing drums is the..........energy

a. chemical   b. light   c. sound   d. potential

6-The produce............energy does not help the blender do its job

a. chemical   b. sound   c. light   d. potential

7-When a piece of coal is burned..........energy is produced

a. thermal   b. solar   c. sound   d. potential

8-When a football player runs, the chemical energy inside his body is convert into and..........energies

a. potential-light   b. kinetic-light   c. thermal-kinetic   d. thermal-light

2-Put (√) or (x)

1-Energy may be destroyed inside different devices. ( )

2. Some of the converted energy does not help some devices do the function for which it was designed ( )

3-The produced sound energy helps the hair dryer to do its function ( )

4. The input energy in a hair dryer is the chemical energy ( )

5. The energy chain of a burning wood is

Chemical energy —Converted into→ Thermal and light energy ( )

6-In waterfalls, the water that falls down has kinetic energy ( )

3-Write the scientific term for each of the following:

The energy that is stored in both batteries and food. (…………….)

2. The energy that is produced from the electric power stations and flows through wires (…………….)

3-A form of energy that is produced from the electric heater and burning coal (……….)

4-The energy that is produced from the blender and helps it do its job (…………….)

5-The wasted energy when using a mobile phone for a long time (…………….)

4-Complete the following sentences

The mobile phone converts chemical energy stored in its battery into ………energy , energy……….. and , and by using it for a long time, some energy is lost in the form of …….. energy

2. The input energy of a hair dryer is ………..energy, while the output energies of a hair dryer are energy. ……..energy, ……..energy and..... energy and …energy

3-The wasted energies that are produced from a vacuum cleaner are

4. The main function of a blender is done by the help of the produced……..energy

5-The input energy in an electric bulb is ………..energy, while its output energies are ………..energy and also…....... energy which doesn't help in its main function.

6-The input energy when recharging a mobile phone is ………energy which is stored in the form of……….. energy inside the phone battery

7-In the electric heater ………..energy is considered as an input energy, while thermal energy is considered as energy

8-The kinetic energy in a hand bell is considered as ………..energy, while in an electric fan is considered as ………….energy

5-Give reasons for

1-Thermal energy in a mobile phone is considered as a wasted energy .

………………………………………………………………………………………………

2-The electrical energy that enters the hair dryer does not come out of the hair dryer in the same form of energy

………………………………………………………………………………………………

3-Sound energy and thermal energy are considered as wasted energy in the blender

………………………………………………………………………………………………

5- 1- *Because Thermal energy doesn't help the mobile phone to do its main function*
2- *Because electrical energy is converted into kinetic, thermal and sound energies*
3- *Because Sound energy don't help the blender to do its main function*

6-What happens if……?

1-You use a mobile phone for a long time (according to the wasted energy)

………………………………………………………………………………………………

2-You turn on an electric fan (according to the change of energy)

………………………………………………………………………………………………

.6- 1-. *Some energy is wasted as thermal energy*
2- *The electrical energy is converted into kinetic energy*

Concept (3.1) About fuel

Key vocabulary

Energy efficiency	كفاءة الطاقة	• Non-renewable	غير المتجدد
Fossil fuels	الوقود الحفري	Renewable	المتجدد
Fuels	وقود	Generate	توليد
Renewable energy resources	مصادر الطاقة المتجددة	Pollution	التلوث

***Fuel** is one of the most important resources of energy that humans depend on to get energy, so where does the fuel we use every day come from?*

الوقود هو أحد أهم مصادر الطاقة التي يعتمد عليها البشر للحصول على الطاقة ، فمن أين يأتي الوقود الذي نستخدمه كل يوم؟

Lesson (1) Fuel



Fuel: *it is any substance that produces thermal energy when it is burned*

الوقود: أي مادة تنتج طاقة حرارية عند احتراقها

The main source of thermal that is produced by fuel, is **the Sun**.

المصدر الرئيسي للحرارة التي ينتجها الوقود هو الشمس.

Oil, **coal** and **natural gas** are considered from **forms of fuels** that are extracted the **underground** and they are the most commonly used fuels in our lives as the used in warming, running transportation and generating electricity.

يعتبر النفط والفحم والغاز الطبيعي من أشكال الوقود التي يتم استخراجها من باطن الأرض وهي أكثر أنواع الوقود استخداماً في حياتنا حيث تستخدم في الاحتباس الحراري وتشغيل النقل وتوليد الكهرباء

Activity 2 Fuels and Road Trips

1. Can cars move on roads when they run out of fuel?

Yes ☐ No ☐

2. Do cars need fuel to get energy to move? Yes No

Yes ☐ No ☐

• There must be fuel in the car to move again after it stops, where the car engine producing thermal energy that is converted into kinetic energy which the fuel burns inside burn

•يجب أن يكون هناك وقود في السيارة لكي تتحرك مرة أخرى بعد توقفها ، حيث ينتج محرك السيارة طاقة حرارية تتحول إلى طاقة حركية يحترق فيها الوقود بداخلها

Activity 3 What Do You Already Know About Fuels?

The fuel is any substance produces thermal energy when it is burned. Among the several forms of fuel are

ما الذي تعرفه بالفعل عن الوقود؟ الوقود هو أي مادة تنتج طاقة حرارية عند احتراقها .من بين العديد من أشكال الوقود

Gasoline (oil) Wood Natural gas Coal





Uses of some different forms of fuel استخدامات بعض أنواع الوقود المختلفة.

Fuel is used for several purposes, such as :يستخدم الوقود لعدة أغراض ، مثل:

1-**Cooking food**, *where coal, natural gas or wood may be used.*

2-**Generating electricity**, *where oil, natural gas or coal may be used.*

3-**Warming**, *where coal or wood may be used.*

4-**Operating all transportation**, *where gasoline (oil) or natural gas may be used.*

1-طهي الطعام ، حيث يمكن استخدام الفحم أو الغاز الطبيعي أو الخشب2 .
2-توليد الكهرباء ، حيث يمكن استخدام البترول والغاز الطبيعي أو الفحم الحجري
3- .الاحتباس الحراري حيث يمكن استخدام الفحم أو الخشب .
--4تشغيل جميع وسائل النقل التي يجوز فيها استخدام البنزين (الزيت) أو الغاز الطبيعي.

The thermal energy produced from the same form of fuel can be used for different purposes, as shown in the following two energy chains:

يمكن استخدام الطاقة الحرارية الناتجة من نفس شكل الوقود لأغراض مختلفة ، كما هو موضح في سلسلتي الطاقة التاليتين:

The use of coal in cooking:

Light energy (from the Sun)
↓
Chemical energy (stored inside coal)
↓
Thermal energy (when burning the coal)

The use of coal in generating electricity :

Light energy (from the Sun)
↓
Chemical energy (stored inside coal)
↓
Thermal and kinetic energies (in electric power stations)
↓
Electrical energy (is transferred through electric wires)

Note Gasoline is a fuel that is made from oil.

Unit 3 (3.2)

Exercises on Lesson (1)

1-Choose the correct answer?

1-Among forms of fuel that present in car fuel stations are …………

a. gasoline and wood   b. natural gas and coal
c. wood and coal.   d. gasoline and natural gas

2-When the speed of a moving car decreases gradually until it stops, this may happen due to all the following situations, except

a. gasoline is completely run out   b. the car engine is damaged
c. the driver presses the brakes pedal.   d. the driver presses the gasoline pedal

3-The opposite figure represents the fuel indicator of a car, which referes to that the fuel tank

a. is completely empty from gasoline
b. is completely full of gasoline.
c. has half amount of gasoline
d. has half amount of water

4-We can use the energy obtained from burning of wood directly for all of the following purposes, except

a warming houses   c. cooking food
b. operating television   d. boiling water

2-Choose from column (B) what suits it in column (A)

(A)	(B)
1-The Sun	a. It is operated by electricity
2-Fuel	b. Its light energy changes into chemical energy in plants
3-Gasoline	c. It is a liquid that can be used as fuel for car
	d. It is any substance that produces thermal e when it is burned

1-………….   2-……….   3-………….

3-Put (√) or (x)

1-As the speed of a car increases, the amount of used fuel decreases. ( )

2. We must check the amount of gasoline in the fuel tank before making a trip by a car( )

3-Both coal and wood produce energy when they are burned. .( )

4. Natural gas is a form of fuels that can be used in generating electrical energy ( )

4-Correct the underlined words

1. We need sound energy, for cooking food and warming houses. (………….)
2. Coal is the main source of most energies on the Earth's surface (………….)

3. Fuel is the substance that produces electrical energy on burning (……….)

5-Write the scientific term of each of the following

1-It is the main source of most forms of energy on the Earth's surface (…………….)
2-The form of energy that is produced as a result of burning wood and coal (………….)
3-It is any substance which produces thermal energy on burning. .

6 -Complete the following sentences

1-Gasoline is burned inside a car engine to produce ……….energy that is converted into........... energy which causes the movement of the car
2-Some forms of fuel can be used in cooking such as ……..,……….. and…….
3-Coal, ………and……. can be used in electric power stations to generates electricity
4-We can use some forms of fuel in warming houses such as………and…….

7-Give reasons for …….?

1-The fuel is very important for different means of transportation

……………………..……………………..……………………..

2-Sometimes the fuel indicator of a car goes down

……………………..……………………..……………………..

3- Gasoline is burned inside a car engine

……………………..……………………..……………………..

7- 1- *Because fuel is burned inside the engines to produce thermal energy that is changed into kinetic energy*
2- *Because the fuel in the car tank runs out*
3- *To produce thermal energy*

8-What happens to…..?

1-The car fuel indicator if the amount of gasoline in a car decreases

……………………..……………………..……………………..

2-The car movement if fuel runs out in a car .

……………………..……………………..……………………..

8- 1- *The car fuel indicator will go down*
2- *The car movement decreases gradually until stop*

.

Lesson (2) Types of fuel

1- Renewable energy resources	2-Non-renewable energy resources
1-مصادر الطاقة المتجددة	2- مصادر الطاقة غير المتجددة
• They are natural resources that can be replaced after a short period of time of use, such as water, solar energy and wind energy	They are natural resources that are uses at a rate faster than they can be replaced such as coal, natural gas and oil
إنها موارد طبيعية يمكن استبدالها بعد فترة قصيرة من الاستخدام ، مثل المياه والطاقة الشمسية والرياح	إنها موارد طبيعية تستخدم بمعدل أسرع مما يمكن استبداله مثل الفحم والغاز الطبيعي وطاقة النفط
Renewable energy resources are those that continually renew or replace the part that has been consumed (used), so they will not run out	• Non-renewable energy resources are those that run out when consumed (used) and cannot be renewed in a short period of time
مصادر الطاقة المتجددة هي تلك التي تجدد باستمرار أو تحل محل القطعة المستهلكة (المستخدمة) ، بحيث لا تنفد	•مصادر الطاقة غير المتجددة هي تلك التي لا تستهلك (تستخدم) ولا يمكن تجديدها في فترة زمنية قصيرة

Types of fuel 1-Biofuel 2-fossil fuel

(1) Biofuel *a fuel that is produced from living organisms that can be planted*

Biofuel *is a renewable energy resource that is continually renewed as plants grow so it is known as "renewable fuel".*

Its primary source : The Sun

Examples: **1. Wood** *is the oldest fuel that is still used all around the world in warming and cooking food.*

1.الخشب هو الوقود الأقدم الذي لا يزال يستخدم في جميع أنحاء العالم في تدفئة وطهي الطعام.

2. Charcoal *is made from wood and it is one of the most important forms of fuel.*

2.يصنع الفحم النباتي من الخشب وهو من أهم أشكال الوقود.

3. Some types of plants such as grass, corn and wood chips *can be used to make a liquid fuel.*

3.بعض أنواع النباتات مثل الحشائش والذرة ورقائق الخشب يمكن استخدامها لصنع وقود سائل.

Conservation of biofuel: حفظ الوقود الحيوي

Although biofuel is a renewable energy resource, it should be conserved (rationalized)

على الرغم من أن الوقود الحيوي هو مصدر طاقة متجددة، إلا أنه يجب الحفاظ عليه (ترشيده)

Using wood as a Source of energy requires cutting down trees →

يتطلب استخدام الخشب كمصدر للطاقة قطع الأشجار

Rapid cutting down trees (known as "deforestation"), causes negative effects on the environment →

يؤدي قطع الأشجار السريع (المعروف باسم "إزالة الغابات") إلى آثار سلبية على البيئة

Therefore, the wood we use should be continuously rationalized so that it will not run out

لذلك ، يجب ترشيد الخشب الذي نستخدمه باستمرار حتى لا ينفد

(2) Fossil a fuel: *produced from old living organisms (plants or animals) that were buried and decomposed over a long period of time.*

الوقود الأحفوري: وقود يتم إنتاجه من كائنات حية قديمة (نباتات أو حيوانات) تم دفنها وتحللها على مدى فترة طويلة من الزمن

Fossil fuel is a non-renewable energy resource, because once if is consumed it runs out faster than it can be renewed.

Its primary source: The Sun

Examples: 1. Oil and natural gas *are formed when the remains of marine organisms (sea animals) were decomposed.*

أمثلة: 1. يتكون النفط والغاز الطبيعي عندما تتحلل بقايا الكائنات البحرية (حيوانات البحر) .

2. Coal *is formed when the remains of plants were decomposed.*

2-الفحم يتكون عندما تتحلل بقايا النباتات.

Formation of coal:

1-300 million years ago, large areas of the Earth were covered with swamps, with a lot of plants growing nearby.

1-منذ 300 مليون سنة ، غطت المستنقعات مساحات كبيرة من الأرض ، مع وجود الكثير من النباتات التي تنمو في الجوار .

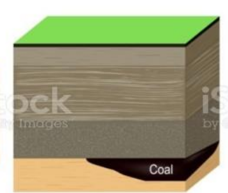
2-When those plants died, their remains were decomposed and covered by hundreds of metres of mud and rocks.

2-عندما ماتت تلك النباتات ، تحلل بقاياها وغطت مئات الأمتار من الطين والصخور

3-Due to the effect of extreme heat and pressure, those remains were turned into coal.

3- نتيجة لتأثير الحرارة والضغط الشديدين تحولت هذه البقايا إلى فحم.





Millions of years

(1) Biofuel	**(2) Fossil a fuel:**
a fuel that is **produced from living organisms** *that can be planted* وقود يتم إنتاجه من كائنات حية يمكن زراعتها.	*It is a fuel that is* **produced from old living organisms** *(plants or animals) that* **were buried and decomposed over** *a long period of time* إنه وقود يتم إنتاجه من كائنات حية قديمة (نباتات أو حيوانات) تم دفنها وتحللها على مدى فترة طويلة من الزمن
Its primary source: The Sun	**Its primary source:** The Sun
Renewable وقود متجدد	*Non-renewable fuel* وقود غير متجدد
Examples: *1. Wood 2. Charcoal* *3. Some types of plants such as grass, corn and wood chips*	**Examples** *1. Oil 2. natural gas* *3. Coal:*

Activity 5 Oil and Water

Oil and water are two types of resources that humans can use to generate energy

النفط والماء نوعان من الموارد التي يمكن للبشر استخدامها لتوليد الطاقة

Formation of oil

Oll comes from deep in the ground, where oil formed from the **decomposition of sea organisms**, *as follows:*

يأتي النفط من أعماق الأرض، حيث يتكون النفط من تحلل الكائنات البحرية، وذلك على النحو التالي:

1-When the sea creatures died, their remains settled on the sea floor

وعندما ماتت هذه الكائنات البحرية، استقرت بقاياها في قاع البحر.

2-Over millions of years, Layers of sediments and rocks covered the remains of those sea creatures. These layers pressed down causing extreme heat and pressure.

2- على مدى ملايين السنين، غطت طبقات من الرواسب والصخور بقايا تلك الكائنات البحرية. تم ضغط هذه الطبقات لأسفل مسببة حرارة وضغطًا شديدين.

3-Over time, as a result of extreme heat and pressure, those remains converted into all

3 - مع مرور الوقت ونتيجة الحرارة والضغط الشديدين تتحول تلك البقايا إلى جميع.

differences between oil and water and how to conserve each of them

الفروق بين الزيت والماء وكيفية الحفاظ على كل منهما

Oll	**Water**
Oll is a nonrenewable energy resource	*Water is a renewable energy resource*
Non-renewable resource مورد غير متجدد *It is a natural material that is used faster than it can be replaced* وهو مادة طبيعية يتم استخدامها بشكل أسرع مما يمكن استبداله	**Renewable resource** *It is a natural material that can be replaced soon after it is used*
Conservation of oil الحفاظ على النفط *Oil is used at a rate faster than the formation of new oil, so it should be conserved by many ways such as* يستخدم النفط بمعدل أسرع من تكوين نفط جديد، لذلك يجب الحفاظ عليه وذلك بعدة طرق مثل *Reducing the use of private vehicles* التقليل من استخدام المركبات الخاصة. *Using of public means of transportation* استخدام وسائل النقل العامة	**Conservation of water** الحفاظ على المياه *Water may not be replaced as quickly as we need it, so people should use water carefully to conserve it by many ways such as:* قد لا يتم استبدال المياه بالسرعة التي نحتاجها، لذلك يجب على الإنسان استخدام المياه بعناية للحفاظ عليها بعدة طرق مثل *-Avoid wasting or polluting water.* تجنب هدر المياه أو تلويثها *Growing plants that do not need large amount of water for Irrigation* زراعة النباتات التي لا تحتاج إلى كمية كبيرة من الماء

Exercises on Lesson (2)

1-Choose the correct answer?

1- All the following are forms of fuel, except ………..
a. wood b. natural gas c. gasoline d. glass

2-……….is considered as the main resource of energy on the Earth's surface
a. Gasoline b. The Sun c. Natural gas d. The moon

3. All the following are renewable resources of energy, except
a. natural gas b. water c. the Sun d. wind

4-Nonrenewable resources of energy take…………. to be formed
a. a short period of time b. a very long period of time
c. few minutes d. few hours

5-Ancient people used ………..as a fuel before discovering gasoline
a. electricity b. water c. wind d. wood

6-Wood is considered as
a. biofuel b. fossil fuel c. liquid fuel d. gaseous fuel

7-Coal was formed under the Earth's surface from the remains of
a. dead animals b. dead plants c. dead humans d. dead insects

8-Extreme heat and pressure under the Earth's surface has an important role in forming
a. wood b. wind c. fossil fuel d. biofuel

2-Choose from column (B) what suits it in column (A)

(A)	(B)
1- Water	a. It needs extreme heat and pressure to be formed from remains of dead plants
2- Wind energy	b. It is the main resource of energy on the Earth's surface
3- Coal	c. It is a gaseous renewable resource of energy
	d. It is a liquid renewable resource of energy

1-…………. 2-………. 3-………….

3-Put (√) or (x)

1-Biofuel is one of nonrenewable resources of energy ( )
2-Extreme cooling under the Earth's surface helps in the formation of oil ( )
3-Water and gasoline are two renewable resources of energy. ( )
4. We have to reduce the usage of the Sun as a source of energy ( )
5-The rate of usage of oil is slower than its rate of formation under the Earth's surface. ( )
6. The Sun is the main source of forming both biofuel and fossil fuel ( )

7-We can make a liquid fuel from grass and wood chips .( )

4-Correct the underlined words

1-We have to increase planting vegetables and fruits that need a large amount of water (………….)
2-In houses, gasoline is used in cooking food as it is one of the oldest known biofuels (………….)
3. The nonrenewable resources of energy take a short period of time to be formed under the Earth's surface (………….)
4. The moon is the main source of both biofuel and fossil fuel (………….)
5-We can use some animals to make a liquid biofuel (………….)
.6-The rate of usage of fossil fuels must be increased (………….)
7-Wood is a form of fossil fuels that can be used in houses.(………….)
8-Water is a nonrenewable resource of energy that can be used as a fuel in cooking food and moving cars (………….)
9-We can conserve oil by increasing the use of private vehicles.(………….)

5-Write the scientific term of each of the following:

1. Natural resources of energy, that take a short period of time to be renewed (………….)
2-Natural resources of energy that take a very long period of time to be formed . (………….)
It is a form of biofuel that can be made from some types of plants such as grass and wood chips (………….)
4-They are fuels that were formed from remains of dead animals and plants under the Earth's surface. (………….)
5. It is a form of fossil fuel that was formed from remains of dead plants under the effect of extreme heat and pressure (………….)
6-It is a form of fossil fuel that was formed from dead marine animals .(………….)

6-Give reasons for

1-Water and wind are considered as renewable resources of energy .

……………………………………………………………………………….

2-Coal and gasoline are considered as nonrenewable resources of energy .

……………………………………………………………………………….

.3-Using wood of trees as a fuel has negative effects on the environment

……………………………………………………………………………….

6- 1- *Because they can be replaced*
2- *Because they are used faster than they can be renewed*
3- *Because continuity of cutting down trees leads to deforestation*

Lesson (3) Fossil Fuel Formation

Activity 7

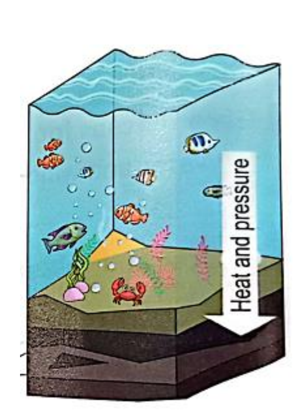
how the fossil fuel is formed :

-The remains of marine living organisms were buried and decomposed under sediments and rocks

تم دفن بقايا الكائنات الحية البحرية وتحللها تحت الرواسب والصخور



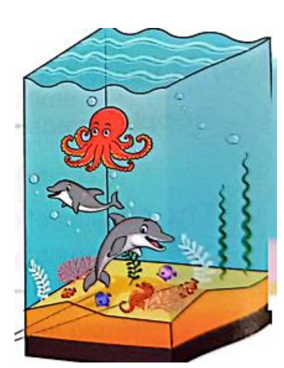
-Due to the effect of extreme heat and pressure, the remains of marine living organisms were turned into oil or natural gas.



-نتيجة لتأثير الحرارة والضغط الشديدين ، تحولت بقايا الكائنات البحرية الحية إلى زيت أو غاز طبيعي.

-The death of marine living organisms that have lived since ancient times.

-موت الكائنات البحرية الحية التي عاشت منذ القدم.



Activity 8 Living:- Without Electricity

The fossil fuels are non-renewable energy resources which are used to generate electrical energy, where, natural gas and oil are used to generate electricity in many regions, so they should be conserved.

يعتبر الوقود الحفري من مصادر الطاقة غير المتجددة التي تستخدم لتوليد الطاقة الكهربائية ، حيث يتم استخدام الغاز الطبيعي والنفط لتوليد الكهرباء في العديد من المناطق ، لذلك يجب الحفاظ عليها.

-Renewable energy resources such as hydroelectric energy (from waterfalls and dams) and wind energy are also used to generate electricity.

-تستخدم مصادر الطاقة المتجددة مثل الطاقة الكهرومائية (من الشلالات والسدود) وطاقة الرياح أيضًا لتوليد الكهرباء.

, we should conserve the energy through many ways such as :

، يجب علينا الحفاظ على الطاقة من خلال عدة طرق مثل

1-Turning off lights when they are not needed.

- إطفاء الأنوار عند عدم الحاجة إليها..

2-Unplugging electrical appliances when not in use.

فصل الأجهزة الكهربائية في حالة عدم استخدامها

Activity 9

Using Fossil Fuels to Generate Electricity استخدام الوقود الحفري لتوليد الكهرباء

• *the fossil fuels have many uses including*

للوقود الحفري استخدامات عديدة منها

1. The use of gasoline and natural gas to operate cars.

2. The use of oil, coal and natural gas to generate electricity.

1. :•استخدام البنزين والغاز الطبيعي لتشغيل السيارات .2. استخدام البترول والفحم والغاز الطبيعي لتوليد الكهرباء.

How fossil fuel is used to produce electricity

To generate electricity, fossil fuel is burned at the electric power stations (power plants) as shown in the following steps :

كيف يتم استخدام الوقود الأحفوري لإنتاج الكهرباء لتوليد الكهرباء يتم حرق الوقود الاحفوري في محطات الطاقة الكهربائية (محطات توليد الكهرباء) كما هو موضح في الخطوات التالية

1 Fuel burns *When fuel burns, it produces thermal energy.*

1 :احتراق الوقود عندما يحترق الوقود ، فإنه ينتج طاقة حرارية

2 Steam rises *This thermal energy is used to heat water producing steam.*

2 .ارتفاع البخار تستخدم هذه الطاقة الحرارية لتسخين المياه المنتجة للبخار.

3 Steam turns turbines *The steam goes inside tubes to be used to operate devices called "turbines".*

3- البخار يدير التوربينات يدخل البخار داخل الأنابيب ليستخدم في تشغيل أجهزة تسمى "التوربينات"

4-Turbines turm generators •مولدات توربينات

The movement of turbines produces kinetic energy, which is used to operate the generator. • When the generator is turned on, it converts the kinetic energy into electrical energy

4- توربينات • تنتج حركة التوربينات طاقة حركية تستخدم لتشغيل المولد • .عند تشغيل المولد ، يقوم بتحويل الطاقة الحركية إلى طاقة كهربائية

5 Electrical energy is transferred to homes

Finally, the electrical energy is transferred through cables (wires) to homes to operate different devices.

5يتم نقل الطاقة الكهربائية إلى المنازل أخيرًا ، يتم نقل الطاقة الكهربائية عبر الكابلات (الأسلاك) إلى المنازل لتشغيل الأجهزة المختلفة

Exercises on Lesson (3)

1-Choose the correct answer?

1-Remains of living organisms that were buried under the Earth's surface are affected by …………..to form fossil fuels

a. low pressure and high temperature b. high pressure and low temperature
c. low pressure and low temperature d. high pressure and high temperature

2. All the following factors play an important role in the formation of fossil fuels except

a. extreme pressure b. extreme heat c. strong wind d. rocks and sediment

3-All forms of fossil fuel are formed

a. above the Earth's surface b. under the Earth's surface
c. above the water surface d. in the air around us

4-All the following are forms of fossil fuels, except .

a. water b. coal c. natural gas d. oil

5-The steps of forming fossil fuel don't include of the remains of the living organisms

a. decaying b. cooling c. burying d. heating

6-We can use the energy that is produced from……… to generate electrical energy .

a. renewable resources only b. nonrenewable resources only
c. renewable and nonrenewable resources d. food including fruits and vegetables

7-All the following actions don't conserve electrical energy, except

a. unplugging unused electrical appliances
b. plugging many unused electrical appliances
c. turning on all the house lights all the day long
d. leaving the television turned on all the day long

8-All the following can be used to generate electrical energy, except

a. oil b. natural gas c. water d. glass

9-Inside the electric power station, heating of……….produces steam

a. turbines b. generators c. water d. fuel

2-Choose from column (B) what suits it in column (A)

(A)	(B)
1- Rocks and sediments	a. is a liquid fossil fuel, that is used to produce electricity
2- Water	b. is a liquid biofuel, that is used to produce thermal energy in houses
3- Oil	c. is a liquid in electric power station that produces steam on heating which turns turbines
	d. play an important role in the formation of fossil fuel

1-………….. 2-………. 3-…………..

3-Put (√) or (x)

1-Any form of fossil fuels must be formed under the Earth's surface. ( )
2. Oil, natural gas and coal can be used to produce electrical energy ( )
Turning off lights that we do not need is a way to conserve electricity. .( )
4. Burning of fossil fuel inside electric power station produces kinetic energy( )
5-The movement of a generator in an electric power station produces potential energy ( )
6-We have to conserve all forms of fuel .( )

4-Correct the underlined words:

1. Fossil fuels include oil, coal and wood (………….)
2-After death of living organisms, their remains are buried under the Earth's surface and exposed to extreme pressure and cool (………….)
3-Water is a nonrenewable energy resource. (………….)
4. In an electric power station, water turns turbines that produce kinetic energy (………….)
5-The movement of generator in the electric power station changes kinetic energy into potential energy (………….)

5-Write the scientific term of each of the following

1-The type of fuel that is used inside the electric power station to produce electricity (………….)
2-The device in the electric power station that produces kinetic energy to operate generators. (………….)
3. The matter that produces steam on heating, which is used to turn turbines in electric power station (………….)
4. The device in the electric power station, that converts kinetic energy into electrical energy (………….)

6-Give reasons for

1-Generators are important in electric power stations
……………………………………………………………………………….
2-We must turn off lights that we do not need
……………………………………………………………………………….

6- 1- Because generators convert kinetic energy into electrical energy
2- To conserve the electricity

7-What happens to

1-A generator that is connected to a damaged turbine in an electric power station
……………………………………………………………………………….
2-The movement of the turbine if the water in an electric power station is not heated .
……………………………………………………………………………….

7- 1- Turbine cannot produce kinetic energy,
2- Water will not produce steam, and not produce kinetic energy

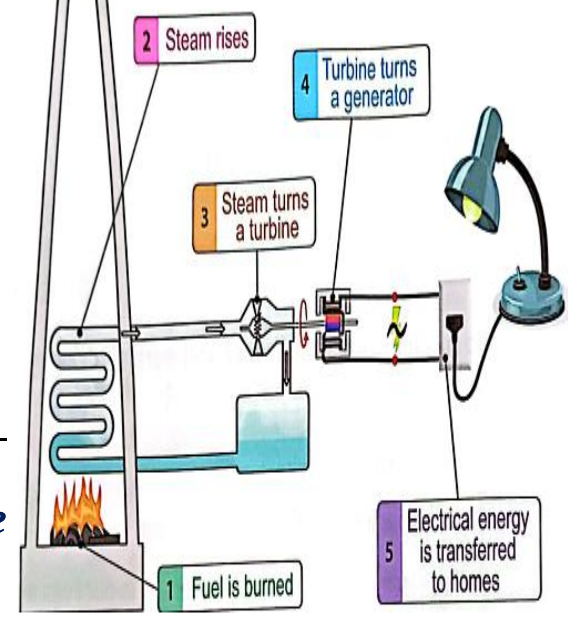
Lesson (4) Big City Environmental Concerns

مخاوف بيئية للمدينة الكبيرة

Activity 10

Some sources of pollution in big cities

بعض مصادر التلوث في المدن الكبرى



1. **Burning fuel** *produces* **smog**, *which* **pollutes the air.**

حرق الوقود ينتج الضباب الدخاني الذي يلوث الهواء.

2-**Pesticides** *used on farms are mixed with water in canals and rivers when rain falls, this lead to* **pollution of soil and water**.

2- المبيدات المستخدمة في المزارع تختلط بالمياه في الترع والأنهار عند هطول الأمطار مما يؤدي إلى تلوث التربة والمياه

3- **Using chemicals** *in factories pollute the air and also the nearby water sources and soil.*

3-استخدام الكيماويات في المصانع يلوث الهواء وكذلك مصادر المياه والتربة المجاورة.

Some effects (impacts) of air pollution on human's health

بعض تأثيرات (تأثيرات) تلوث الهواء على صحة الإنسان

1. **Smog** *from* **cars** *cause* **irritation** *of human's* **eyes** *and* **lungs**.

الضباب الدخاني من السيارات يسبب تهيجا في عيون الإنسان ورئتيه.

2. *Scientists have found that sm***og contains tiny particles** *that the human breathes these particles* **irritate the lung***s, causing the* **damage** *of* **tissues of the respiratory system.**

2. وجد العلماء أن الضباب الدخاني يحتوي على جزيئات صغيرة يتنفسها الإنسان وهذه الجزيئات تهيج الرئتين مسببة تلف أنسجة الجهاز التنفسي.

Activity 11 Burning Fossil Fuels and Pollution حرق الوقود الحفري والتلوث

• **People need energy to operate trains**, **cars** *and* **ships**, *and even more energy is needed to* **supply houses, schools** *and* **factories with electricity**.

•يحتاج الناس إلى الطاقة لتشغيل القطارات والسيارات والسفن ، مزيد من الطاقة لتزويد المنازل والمدارس والمصانع بالكهرباء

• *To get this energy, the solution was to extract and use fossil fuels to generate electrical energy, where:*

للحصول على هذه الطاقة ، كان الحل هو استخراج واستخدام الوقود الأحفوري لتوليد الطاقة الكهربائية ، حيث

- **Coal**, **oil** *or* **natural gas** *is burned at* **electric power stations** *and the* **energy produced** *from burning fuel is used to generate electricity.*
- **Then, the generated electricity** *is* **transferred** *to different places through electric* **wires**.

-يتم حرق الفحم أو الزيت أو الغاز الطبيعي في محطات الطاقة الكهربائية وتستخدم الطاقة الناتجة عن احتراق الوقود لتوليد الكهرباء .
-ثم يتم نقل الكهرباء المولدة إلى أماكن مختلفة عن طريق الأسلاك الكهربائية.

Harms of burning of fossil fuels on the environment

Burning fuel not only produces electricity but also pollutes the environment, where burning of coal and oil produces carbon dioxide gas which causes :

1-Acid rains الأمطار الحمضية	2 Global warming 2الاحتباس الحراري
Carbon dioxide gas combines with water in the air to form carbonic acid, acid rains that cause : -The death of trees. – -Decomposition and dissolving of some rocks including bricks of buildings. - Chemical changes in the structure of lakes causing the death of fish. -Chemical changes in the structure of soil. يتحد غاز ثاني أكسيد الكربون مع الماء في الهواء لتكوين حمض الكربونيك ، مما يؤدي إلى هطول أمطار حمضية تسبب - موت الاشجار .- تحلل وتذويب بعض الصخور بما في ذلك طوب المباني . – التغيرات الكيميائية في بنية البحيرات مما تسبب في موت الأسماك .التغيرات الكيميائية في بنية التربة -	Increasing the amount of carbon dioxide gas in the air forms a layer in the atmosphere that traps heat above the Earth's surface causing a slow rise in the Earth's temperature, which is known as - global warming. تؤدي زيادة كمية غاز ثاني أكسيد الكربون في الهواء إلى تكوين طبقة في الغلاف الجوي تحبس الحرارة فوق سطح الأرض مسببة ارتفاعًا بطيئًا في درجة حرارة الأرض ، وهو ما يُعرف باسم الاحتباس الحراري.

How to reduce acid rains and global warming كيفية تقليل الأمطار الحمضية والاحتباس الحراري

1- Reduce our consumption of energy, *the amount of burning of fossil fuel to generate energy decreases.*

2- Decreases amount of burning of fossil fuel, *the amount of carbon dioxide and other pollutants in the air which we breathe in will decrease.*

1-تقليل استهلاكنا للطاقة ، تقل كمية حرق الوقود الأحفوري لتوليد الطاقة.

2- يقلل من كمية احتراق الوقود الأحفوري وكمية ثاني أكسيد الكربون وغيرها من الملوثات في الهواء الذي نتنفسه.

Activity 12 Conserving Fossil Fuels الحفاظ على الوقود الحفري

Fossil fuels burn to generate electricity *that lights our homes, so we should conserve this of fuel, where:*

- There is a limited amount of fossil fuels available on the Earth.

Fossil fuels *are formed over* millions of years, *this means what we use cannot be replaced as quickly as it is consumed.*

Fossil fuels *are considered* non-renewable natural resources of energy *that will run out from the Earth if consumption is not rationalized.*

يحترق الوقود الأحفوري لتوليد الكهرباء التي تضيء منازلنا ، لذلك يجب أن نحافظ على هذا الوقود ، حيث: • هناك كمية محدودة من الوقود الأحفوري المتاحة على الأرض. يتكون الوقود الأحفوري على مدى ملايين السنين ، وهذا يعني أن ما نستخدمه لا يمكن استبداله بالسرعة التي يتم استهلاكه بها. يعتبر الوقود الحفري من الموارد الطبيعية غير المتجددة للطاقة والتي ستنفد من الأرض إذا لم يتم ترشيد الاستهلاك

Some methods of conserving fossil fuels بعض طرق الحفاظ على الوقود الحفري

1. Walking or using bicycles *instead of driving a car.*
2. Turning off the lights
3. Replacing fossil fuels *with* renewable energy resources *such as : solar energy, hydroelectric energy and wind energy*

1.المشي أو استخدام الدراجات بدلاً من قيادة السيارة 2-إطفاء الأنوار .
3.استبدال الوقود الأحفوري بالطاقة المتجددة مثل: الطاقة الشمسية والطاقة الكهرومائية وطاقة الرياح

Disadvantages of using fossil fuels in energy production

The amount of fossil fuels is limited and could run out.

• When some forms of fossil fuels burn, *they emit gases that cause : -*
1-Air pollution.
2- Raises the temperature of Earth *due to Trap heat in the atmosphere, planet and changes its climate. This phenomenon is known as "global warming."*

مساوئ استخدام الوقود الأحفوري في إنتاج الطاقة كمية الوقود الأحفوري محدودة ويمكن أن تنفد • .عند احتراق بعض أنواع الوقود الأحفوري ، فإنها تنبعث منها غازات تسبب: - 1- تلوث الهواء -2 .يرفع درجة حرارة الأرض بسبب الحرارة الشديدة في الغلاف الجوي والكوكب وتغير مناخه .تُعرف هذه الظاهرة باسم "الاحتباس الحراري."

Exercises on Lesson (4)

1-Choose the correct answer?

1-Air pollution is usually caused due to…….. of fuel

a. cooling b. warming c. freezing d. burning

2-To decrease the pollution in a city to its lowest limit, we have to build a factory…….

a. That uses oil inside the city b. That uses coal inside the city
c. That uses natural gas, outside the city d. That uses coal, outside the city

3-Smog causes imitation of ……. of humans

a. stomach and eyes b. eyes and lungs c. small intestine d. large intestine

4-Smog contains tiny particles that

a. damage the tissue of human respiratory system.
b. damage the tissue of human digestive system
c. help the human body grow up
d. keep the human body healthy.

5-To reduce pollution with smog, we have to operate cars by

a gasoline or natural gas. b. gasoline or electricity
c. electricity or natural gas d. gasoline or coal

6-Acid rain is formed when …………combines with rain water

a. oxygen gas b. carbon dioxide gas c. dust d. sand

7-All the following are harmful effects of acid rain, except

a global warming b. death of trees
c. change in the chemical nature of lakes
d. change in the chemical nature of the soil

2-Choose from column (B) what suits it in column (A)

(A)	(B)
1- Acid rain	a. It is a liquid that is considered as renewable resource of energy
2- Carbon dioxide gas	b. It is a gas that is necessary for respiration of living organisms
3- Water	c. It is a gas that causes trapping heat on Earth when it increases in air
	d. It is formed when carbon dioxide gas combines with water in the air

1-…………. 2-………. 3-………….

3-Put (√) or (x)

1- Smog doesn't cause any tissue damage in the human respiratory system. ( )
2- Acid rain causes soil and water pollution ( )
3. Global warming can dissolve some rocks ( )
4. The heat trapped on Earth causes global warming ( )
5- Acid rain helps trees to survive ( )
6-To reduce pollution and conserve nonrenewable resources of energy we must decrease their use ( )

4-Write the scientific term of each of the following

1- It is a phenomenon in which the Earth's temperature increases when carbon dioxide gas increases in the air (…………..…….)
2-It is a system in the human body whose tissues are damaged due to breathing a big amount of smog (………….…….)
3-It is a type of rain that is formed when carbon dioxide gas combines with water .3 in the air (………….…….)

5-Complete the following sentences

1-When pesticides mix with water in canals, this causes the pollution of ………….. and…………………..
2-Factories may cause pollution of………….. ,………….. and………………….. due to chemicals they use
3-Smog leads to………………….. pollution that causes irritation of,………….. and…………………. of humans.
4-Tiny particles found in………….. lead to air pollution that causes tissue damage of the human ……………….system
5-Burning coal and oil produces ………….gas, which combines with ………….air forming acid………………….
6-Increasing the burning of fossil fuel produces more…………. gas that causes …………………. pollution.
7-Acid rain leads to change in the chemical nature of lakes causing death of …………………………….
8-Burning coal and oil produces …………..gas which forms a layer in the atmosphere causing rise in the Earth's temperature in a phenomenon known as ………..
9-The change in the chemical nature of………….. due to……….. rain leads to the death of trees

6-Give reasons for

1-Smog of cars is very dangerous to human health
…………………………………………………………………………………..
2-Farmers must decrease the use of pesticides
…………………………………………………………………………………..
3-Increase the burning of fossil fuel causes acid rain
…………………………………………………………………………………..
4-Global warming occurs due to the increase of burning coal and oil
…………………………………………………………………………………..
5-Acid rain has a bad effect on buildings in cities.
…………………………………………………………………………………..

6- 1- *Because the smog of cars causes irritation of human's eyes and lungs*
2- *Because pesticides cause the pollution of soil and water*
3- *Because burning fossil fuel produces carbon dioxide gas which combines with water air forming acid rain*
4- *Because burning coal and oil produces carbon dioxide that traps heal on Earth*
5- *Because acid rain causes dissolving of some rocks including the rocks used for building*

Concept (3.3) Renewable Energy Resources

مصادر الطاقة المتجددة

Heat	الحرارة	Light Watermills	الطواحين الخفيفة
Turbine	التوربينات	Radiation	الإشعاع
Windmills	طواحين الهواء	Solar energy	الطاقة الشمسية

Lesson (1) Windmills and Watermills

طواحين الهواء والطواحين المائية

Activity 2 Windmills and watermills

Hundreds of years ago, people needed machines to make their lives easier, for example, they used windmills and watermills which helped them to grind grain to make flour.

طواحين الهواء والطواحين المائية منذ مئات السنين ، كان الناس بحاجة إلى آلات لجعل حياتهم أسهل ، على سبيل المثال ، استخدموا طواحين الهواء والطواحين المائية التي ساعدتهم على طحن الحبوب لصنع الدقيق.

Points of comparison	Windmills طواحين الهواء	Watermills والطواحين المائية
Energy used	*The* **wind movement** *generates* **kinetic** *energy which moves the mill's blades, then kinetic energy goes to other parts of the mill to* **grind** *the grain*	*The* **water movement** *generates* **kinetic** *energy which moves the mill's blades, then kinetic energy goes to other parts of the mill to* **grind** *the grain*
	تولد حركة الرياح طاقة حركية تحرك شفرات المطحنة ، ثم تنتقل الطاقة الحركية إلى أجزاء أخرى من المطحنة لطحن الحبوب	تولد حركة الماء طاقة حركية تحرك شفرات المطحنة ، ثم تنتقل الطاقة الحركية إلى أجزاء أخرى من المطحنة لطحن الحبوب
Advantages	• Low cost.تكلفة منخفضة. • Renewable energy resource مصادر الطاقة المتجددة	• Low cost.تكلفة منخفضة. • Renewable energy resource مصادر الطاقة المتجددة
Disadvantages	**Sometimes the wind does not blow and the windmills** do not move so they are unable to do their job.	**The water supply may dry up and the watermills do not move,** so they are unable to do their job
	في بعض الأحيان لا تهب الرياح ولا تتحرك طواحين الهواء لذا فهي غير قادرة على القيام بعملها.	قد يجف مصدر المياه ولا تتحرك الطواحين ، لذلك لا يمكنهم القيام بعملهم

Old mills and modern tubes

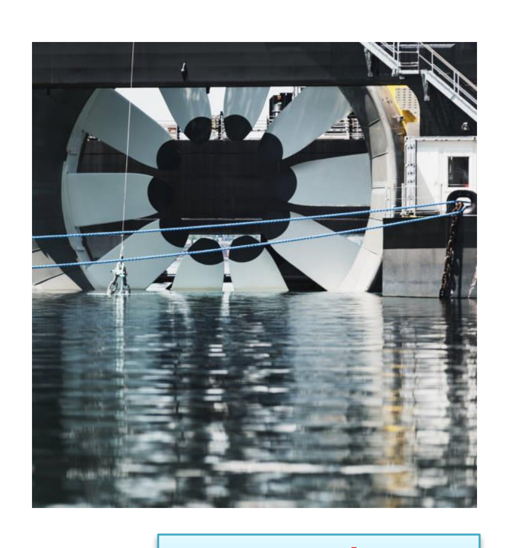
Old windmills طواحين الهواء القديمة	modern wind turbin توربنات الهواء الحديثة
They use wind as an energy resource يستخدمون الرياح كمصدر للطاقة	They use wind as an energy resource يستخدمون الرياح كمصدر للطاقة
They have openings in their blades لديهم فتحات في شفراتهم	They don't have openings in their blades ليس لديهم فتحات في شفراتهم
They have more blades than those of the modern wind turbines لديهم شفرات أكثر من تلك الموجودة في توربينات الرياح الحديثة	They have fewer blades than those of the old wind mails لديهم شفرات اقل من تلك الموجودة في طواحين الهواء القديمة
•They are shorter than the modern wind turbines هم أقصر من توربينات الرياح الحديثة	•They are taller than the old wind mails هم اطول من طواحين الهواء القديمة
They are used in crushing (grind)grain تستخدم في طحن الحبوب	They are used in generating electricity تستخدم في توليد الكهرباء


shutterstock.com · 607493288



Old watermills طواحين الماء القديمة	modern water turbin توربنات الهواء الحديثة
They use the movement of water as an energy resource يستخدمون حركة الماء كمصدر للطاقة	They use the movement of water as an energy resource يستخدمون حركة الماء كمصدر للطاقة
They are used in crushing (grind)grain تستخدم في طحن الحبوب	They are used in generating electricity تستخدم في توليد الكهرباء





Concept (3.3)

Exercises on Lesson (1)

1-Choose the correct answer?

1- All of the following are examples of renewable energy resources, except …

a. fossil fuel b. waterfalls c. wind d. sunlight

2. Solar panels use solar energy to generate ……….energy which is used in light houses

a. sound b. electrical c. potential d. kinetic

3-The wind movement has…………. energy which moves the windmill's blades

a. kinetic b. solar c. thermal d. potential

4. Both modern wind turbines and modern water turbines are similar in their

a. shape b. ability to generate electrical energy
c. blades number d. ability to generate potential energy

2-Put (√) or (x)

1-Wind turbines generate electricity by using the energy of water flow ( )
2. Machines make our lives more easier ( )
3.The low cost of the energy used in watermills is from the disadvantages of using this energy ( )
4- Windmills can do their job all the time as wind never stops blowing ( )
5. Both wind movement and water flow have kinetic energy ( )
6-Both modern wind turbines and old windmills are used to generate electricity( )
7-All devices require energy to do their functions ( )

3-Correct the underlined words

1-Solar panels use sound energy to generate electricity (……………….)
2. Water turbines generate electricity by using the energy of wind movement (……………….)
3-Manual mixer depends on electricity to do its function (……………….).
4. The high cost of producing energy in windmills is one of its advantages (……………….)

4-Write the scientific term of each of the following:

1. A mill that is turned by water flow (……………….)
2- A mill that is operated by wind movement. (……………….)
3. The type of energy that is produced from wind turbines to operate different home devices (……………….)

5-Complete the following sentences

1-In electric power stations, the burning coal produces …………..energy to generate electricity, while wind turbines generate electricity by using the …………..energy
2-The water flow has kinetic energy, which moves the…………… of water turbines to transform this energy into ………………..energy

3-Both............. and …………..are used to crush grain to make flour hundreds of years ago, but now we use them to generate…………………

4-Although modern wind turbines and old windmills vary in shape, they all use …………………… energy to be powered

6-Give a reason for the following

Humans used windmills and watermills from hundreds of years ago

……………………………………………………………………………………

6- - Because they helped them to crush grain to make flour

7-What happens if …………?

1-Wind doesn't blow in an area that contains many modern wind turbines

……………………………………………………………………………………

2-Sunlight falls on solar panels

……………………………………………………………………………………

7- 1- The blades of wind turbines don't move and also don't generate electricity

2- The solar energy of the Sun is converted into electrical energy

8-Complete the following energy chain by using the energies below.

(You may use each word more than once):

(thermal-electrical - kinetic)

Burning of coal produces …………

converted into

………… energy to move the machines of electric power stations

Wind blowing produces ……………energy that moves the turbines of wind turbines

converted into

……… energy that travels through wires to houses

To operate

Televisions

.

Lesson (2) Using Energy from the Sun

Using Energy From the Sun استخدام الطاقة من الشمس

Activity 3

الشمس**The Sun** is the **main source** of **energy** on Earth as it provides us with light and heatهي المصدر الرئيسي للطاقة على الأرض لأنها تزودنا بالضوء والحرارة

At night when the Sun is not visible, you can feel warm because

في الليل عندما تكون الشمس غير مرئية في السماء ، يمكنك الشعور بالدفء بسبب ذلك

- **The atmosphere** **absorbs** the energy of the **Sun**. -. يمتص الغلاف الجوي طاقة الشمس
- **Land and water** on Earth's surface **absorb** the energy of the Sun, which **causes** a **rise in the Earth's temperature**

- -تمتص الأرض والمياه الموجودة على سطح الأرض طاقة الشمس مما يتسبب في ارتفاع درجة حرارة الأرض

Solar energy coming from the **Sun**الطاقة الشمسية قادمة من الشمس

It contains **light** and **thermal** energies from the Sun

The solar energy that is produced by the Sun contains a type of energy called " **radiant energy**" or "**radiation**"

يحتوي على طاقات ضوئية وحرارية من الشمس تحتوي الطاقة الشمسية التي تنتجها الشمس على نوع من الطاقة يسمى "الطاقة المشعة" أو "الإشعاع"



Uses of solar energy

Direct source of thermal energyمصدر مباشر للطاقة الحرارية

.exposing yourself to the sun rays to feel warm

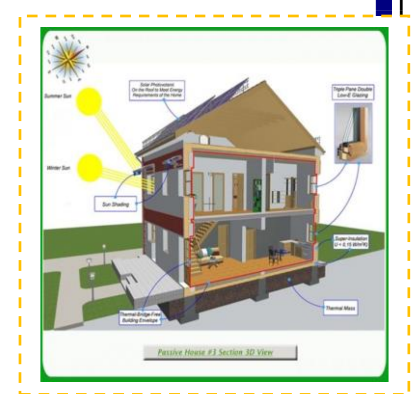
تعريض نفسك لأشعة الشمس لتشعر بالدفء.

Greenhouses **allow the entry of solar energy** (radiant energy that comes from the Sun, then this **radiant** energy is **converted into thermal energy** that warms the inside of the greenhouses, which helps farmers to plant the crops that only grow in warm climates

الصوبة الزجاجية تسمح بدخول الطاقة الشمسية (خاصة الطاقة الاشعاعية) التي تأتي من الشمس ، ثم تتحول هذه الطاقة الاشعاعية إلى طاقة حرارية تقوم بتدفئة داخل البيوت البلاستيكية ، مما يساعد المزارعين على زراعة المحاصيل التي تنمو فقط في المناخات الدافئة

Warming houses Houses can be built in a way that enables the energy of the **Sun to warm** them by **placing large** windows on the walls that **face** the Sun for most of the day

تدفئة المنازل يمكن بناء المنازل بطريقة تمكن طاقة الشمس من تسخينها عن طريق وضع نوافذ كبيرة على الجدران التي تواجه الشمس معظم النهار





Cooking food طبخ الطعام

Convergent (concave mirrors) are used to **collect** and **focus sun rays** to **heat metal pots** and **cook the food** inside **Convergent** (concave) mirrors are **curved mirrors**

طهي الطعام حيث يتم استخدام المرايا المتقاربة (المرايا المقعرة) لتجميع أشعة الشمس وتركيزها لتسخين الأواني المعدنية وطهي الطعام بداخلها المرايا (المقعرة) هي مرايا منحنية



Heating water تسخين المياه

Solar water heaters are made of panels made of **black pipes** can be **placed** on the **roof of houses** to heat the water when it passes through these pipes, then the **heated water is stored in a water tank** to be used later

سخانات المياه بالطاقة الشمسية مصنوعة من ألواح مصنوعة من أنابيب سوداء يمكن وضعها على أسطح المنازل لتسخين المياه عندما تمر عبر هذه الأنابيب ، ثم يتم تخزين المياه الساخنة في خزان مياه لاستخدامها فيما بعد.

Activity 4

Solar Energy طاقة شمسية

How solar panels convert solar energy coming from the Sun into electricity كيف تحول الألواح الشمسية الطاقة الشمسية القادمة من الشمس إلى كهرباء



Solar panels الألواح الشمسية

Solar panels can be very **small** that they can supply only one light **bulb with energy**, or **very large** that they can **supply buildings** or **cities** with energy

يمكن أن تكون الألواح الشمسية صغيرة جدًا بحيث يمكنها تزويد مصباح كهربائي واحد فقط بالطاقة ، أو كبيرة جدًا بحيث يمكنها تزويد المباني أو المدن بالطاقة



How do solar panels work? كيف تعمل الألواح الشمسية؟

- **Solar panels** are composed of many **small solar cells**

These cells capture solar energy (especially radiant energy) coming from the and convert it directly into electrical energy.

- **Solar panels** are used to **generate electricity**

تتكون الألواح الشمسية من العديد من الخلايا الشمسية الصغيرة تلتقط هذه الخلايا الطاقة الشمسية (خاصة الطاقة المشعة) القادمة من وتحويلها مباشرة إلى طاقة كهربائية • تستخدم الألواح الشمسية لتوليد الكهرباء.

Uses of electricity generated by solar panels

This electricity can be used directly to light the streets
This electricity is used to recharge some types of batteries, like some calculators with small solar cells

استخدامات الكهرباء المتولدة من الألواح الشمسية يمكن استخدام هذه الكهرباء مباشرة لإنارة الشوارع تستخدم هذه الكهرباء لإعادة شحن بعض أنواع البطاريات ، مثل بعض الآلات الحاسبة التي تحتوي على خلايا شمسية صغيرة

•This electricity is used in houses to operate various electric devices
This electricity is used to operate irrigation equipment in some villages

Check your understanding

In the table below, classify the following energies in the solar pa system into input and output energy

(Solar energy-Electrical energy)

Input energy	Output energy
....	....

Exercises on Lesson (2)

1-Choose the correct answer?

1- In the absence of sunlight, all the following items will be negatively affected, except

a. plants b. human c. rocks d. animals

2-Solar water heater changes energy …………into ………..energy

a. electrical-thermal b. solar-sound c. electrical-sound d. solar-thermal

3-The two forms of energy that transfer from the Sun to the Earth in the form of waves are ………..energy and ……………..energy

a. electrical-light b. sound-thermal c. thermal-chemical d. light-thermal

4-When land and water areas on Earth absorb the solar energy, the …….increases

a. temperature on Earth b. speed of rotation of Earth
c. speed of rotation of moon d. speed of rotation of Sun

5-The solar energy is converted into……… energy in greenhouses

a. electrical b. sound c. thermal d. potential

6-Greenhouses allow farmers to plant crops that only grow in

a. polar climate b. Warm climate
c. absence of sunlight d absence of water

7-Using convergent …………sheets in cooking food is one of the benefits of using the solar energy

a. paper b .plastic c .mirror d. wooden

8-All the following are from the uses of electricity generated by solar panels except

a. operating windmills b. operating irrigation equipment
c. lighting streets d. operating calculators

2-Choose from column (B) what suits it in column (A)

(A)	(B)
1- Solar water heater	a. the energy that is used by wind turbines
2- Light energy and thermal energy	b. use the energy of the Sun to heat water in homes
3- Electrical energy	c. are the two main forms of energy produced from the Sun
	d. is the form of energy produced from solar panels

1-…………. 2-………. 3-………….

3-Put (√) or (x)

1- The Sun is the main source of energy on Earth ( )
2-Living organisms don't need the Sun to survive ( )
3-The Sun provides the Earth with light and heat ( )
4-Solar water heater is formed of panels made of black pipes. ( )
5. Placing large windows on the walls that face the Sun helps in warming houses( )
6- A solar panel consists of one small solar cell ( )

4-Correct the underlined words

1-In the absence of the light of __moon__, living organisms cannot survive (………..)
2. Thermal energy and __sound__ energy are produced from the Sun and reach the Earth (………..)
3-Small solar panels are used to supply one light bulb with __sound__ energy (………..)

5-Write the scientific term of each of the following

1-A type of mirrors that is used to collect and focus sunlight onto metal pots to heat them and cook the food inside (………..)
2. A panel designed to absorb the energy of the Sun to generate electricity (………..)

6-Complete the following sentences

1-The solar energy is produced from the………., and the…………. energy is a type of this energy which is carried by sun rays
2-When we expose our bodies to the Sun, we feel…………….
4- We can use solar energy in cooking by using concave …………. which collect and focus …………..onto metal pots to heat them
4-Greenhouses convert the radiant energy of the sun rays into ………. energy that allows farmers to plant crops which grow in ………….climates
5-Solar cells that convert radiant energy coming from the sun rays into ……….. energy
6-Solar cells that are found in some calculators produce ………energy that is used to recharge their…………….
7-In some villages, solar panels are used to generate operate…......... energy that is used to …………..equipment

7-Give reasons for

1- Sometimes the Sun is not visible in the sky but you can feel its warmth
………………………………………………………………………………………
2. Some electrical devices have solar panels which are composed of many solar cells
………………………………………………………………………………………

7- 1- *Because the atmosphere absorbs the Sun's thermal energy, then land and water absorb this energy which causes a rise in the Earth's temperature*
2- *To absorb the solar energy coming from the Sun and convert it into electrical*

.

Lesson (3) Harness the Wind

تسخير(استخدام)الرياح

The renewable energy resources *(Water -Wind -The Sun)*

Wind turbines *convert kinetic energy of the wind into electricity*

Using energy of the wind استخدام طاقة الرياح

*1- **solar energy** (especially radiant energy)*
reach** different **regions** of the **world

1-تصل كميات مختلفة من الطاقة الشمسية (خاصة الطاقة الإشعاعية) إلى مناطق مختلفة من العالم

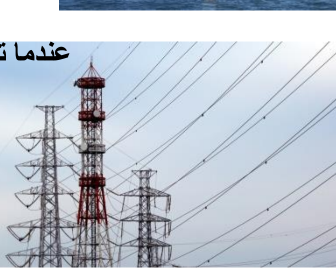


*2-**Radiant energy** causes the **air** around the Earth to heat up to different degrees, where the **difference in temperatures between cold and hot air** causes air to move and **wind to blow***

2-تؤدي الطاقة الإشعاعية إلى تسخين الهواء حول الأرض بدرجات مختلفة، حيث يكون الفرق في درجات الحرارة بين الباردة والهواء الساخن يتسبب في تحرك الهواء وهبوب الرياح

*3-**Kinetic energy** of the **wind movement** is used to **rotate** the blades of **wind turbines***
*When the **blades** of **wind turbines rotate**, this causes the rotation of turbines and that **leads to generating electrical energy***

3-تستخدم الطاقة الحركية لحركة الرياح في تدوير شفرات توربينات الرياح
عندما تدور شفرات توربينات الرياح فإن ذلك يسبب دوران التوربينات ويؤدي إلى توليد الطاقة الكهربائية



*4-**This electrical energy** is **transmitted through big wires** to different places such as **houses** and **factories***

4- تنتقل هذه الطاقة الكهربائية عبر أسلاك كبيرة إلى أماكن مختلفة مثل المنازل والمصانع

The following diagram shows the energy chain of the wind turbines



Converted into → **Thermal energy** → Converted into → **Kinetic energy** → Converted into → **Electrical energy**

Note In wind turbines, *when the kinetic energy of wind increases, the blades rotate faster, so the efficiency of wind turbines increases*

ملاحظة في توربينات الرياح ، عندما تزداد الطاقة الحركية للرياح ، تدور الشفرات بشكل أسرع ، وبالتالي تزداد كفاءة توربينات الرياح

Check your understanding-Put (√) or (x)

1-Kinetic energy of the wind is converted into electrical energy by wind turbines ( )
2-Wind is a nonrenewable energy resource ( )
3-The difference in air temperatures around the Earth causes air to move and wind to blow ( )

Exercises on Lesson (3)

1-Choose the correct answer?

1-All the following are renewable energy resources, except

a. waterfalls b. coal c. the Sun. d. wind

2-Kinetic energy of……………. movement is used to rotate the blades of wind turbines

a. the moon b. stars c. water d. wind

3-When the blades of wind turbines rotate, this causes their turbines to rotate that leads to generating ……………energy

a. electrical b. solar c. chemical d. potential

4-The electrical energy is transmitted from wind turbines to houses through .

a. water b. wind c. coal d. wires

5-The electrical energy that is transmitted to houses can operate all the following devices, except

a. washing machine b. manual mixer
c. electric fan d. electric heater

6-The change of energy in an………… is opposite to the change of energy in a wind turbine

a. electric bell b. electric heater c. electric iron d. electric fan

7-When.........energy of wind increases, the blades of wind turbines spin more quickly

a. kinetic b. potential c. chemical d. solar

2-Put (√) or (x)

1-Wind is a renewable energy resource ( )
2. There is a similarity in temperatures between cold and hot air ( )
3-In wind turbines, the kinetic energy is converted into chemical energy ( )
4. Electricity generated by wind turbines is transmitted through wind ( )
When air blows into the wind turbine with a small force, the blades spin slowly(

3-Correct the underlined words:

1. Potential energy of the wind is converted into electrical energy by wind turbines (…………….)
2-The difference in temperatures between cold and hot air causes air to stop (…………….)
3-Water turbines rotate when their blades rotate as wind blows (…………….)
4. When air blows into the wind turbine with a large force, the blades spin slower (…………….)

4-Write the scientific term of each of the following

1-A natural movement of air that is resulted from the difference in temperatures (…………….)
2-A turbine that uses the power of flowing air to generate electricity(…………….)
3-An energy that is generated from wind turbines and is transmitted through .wires to houses and factories (…………….)

Lesson (4) Falling Water
مساقط الماء

Activity 7

Falling Water سقوط الماء

*Rivers flow downhill, and during this process the gravitational - **potential energy** of water is converted into **kinetic energy** that helps water turbines rotate to generate* **electricity generate**

-تتدفق الأنهار إلى أسفل ، وخلال هذه العملية يتم تحويل طاقة الجاذبية للمياه إلى طاقة حركية تساعد توربينات المياه على الدوران لتوليد الكهرباء.

Dams are built on rivers to **control the water flow** and **increase the potential energy** of water.

السدود تبني على الأنهار للتحكم في تدفق المياه وزيادة الطاقة الكامنة للمياه

Hydroelectric dam السد الكهرمائي

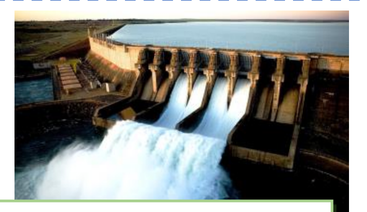
Which is used to **generate electricity** using the flow of water

الذي يستخدم لتوليد الكهرباء باستخدام تدفق المياه

How can electricity be generated from hydroelectric dams using water turbines?

A **hydroelectric dam** prevents the flow of river water, so .the **potential energy** of water **increases**

يمنع السد الكهرمائي تدفق مياه النهر ، وبالتالي تزداد الطاقة الكامنة للمياه.



When water is released, it flows through water **turbines** in the **dam** *and* .the **potential** energy of water is **converted** into **kinetic** energy

عندما يتم إطلاق الماء ، فإنه يتدفق عبر التوربينات المائية في السد ويتم تحويل الطاقة الكامنة للمياه إلى طاقة حركية.

The flow of **falling water** that **has kinetic energy** helps water turbines rotate that operate generators to generate electricity

يساعد تدفق المياه المتساقطة ذات الطاقة الحركية على تدوير توربينات المياه التي تشغل المولدات لتوليد الكهرباء..

This electricity is sent through long electric **wires** to the places where it is needed, and this type of electricity is called "**hydroelectric energy**" or .**hydroelectricity**

يتم إرسال هذه الكهرباء عبر أسلاك كهربائية طويلة إلى الأماكن التي تحتاجها ، ويسمى هذا النوع من الكهرباء "الطاقة الكهرومائية" أو الطاقة الكهرومائية.

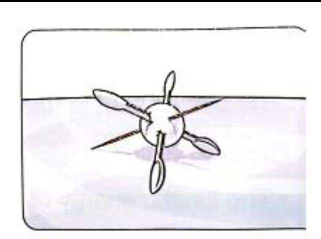
Hydroelectric energy (hydroelectricity): الطاقة الكهرومائية (الكهرومائية)

a type of electrical energy generated by water turbines in dams
نوع من الطاقة الكهربائية تولد بالتوربينات المائية في السدود

The use of water to generate electricity	The use of wind to generate electricity
Differences	
water is used in places where dams built on rivers	Wind in places with strong wind
Similarities التشابه	
Both of them are renewable energy resources كلاهما من موارد الطاقة المتجددة Both of them use kinetic energy to operate turbines to generate electricity كلاهما يستخدم الطاقة الحركية لتشغيل التوربينات لتوليد الكهرباء	

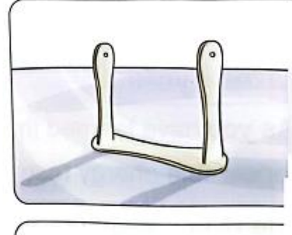
Activity 7 Modeling a Turbine Generator

نموذج لمولد توربيني



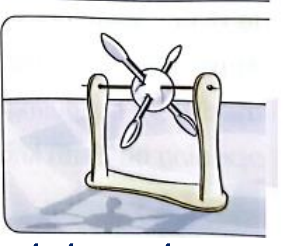
Make the blades of the water turbine using the ball of cork, four plastic spoons and the toothpick as shown .in the opposite figure

اصنع قاعدة التوربين المائي باستخدام العصي الخشبية الثلاثة ومسدس الشمع كما هو موضح في الشكل المقابل.



Make the base of water turbine by using the three wooden sticks and the wax gun as shown in the opposite .figure

اصنع شفرات التوربين المائي باستخدام كرة الفلين وأربع ملاعق بلاستيكية وعود أسنان كما هو موضح في الشكل المقابل.



Fix the blades to the base as shown in the opposite figure

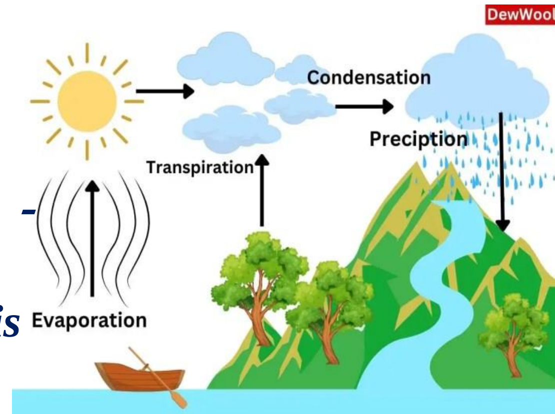
Observation *The blades start to rotate again*

Conclusions

The kinetic energy of moving water in rivers is used to rotate water .turbines to generate hydroelectric energy

.turbines will be operated all the time

دورة المياه Water cycle



- *.the water is renewable energy resource*
- *The river's water doesn't renewed (return back) to its source through the dam immediately, but during a process which is happening on Earth as "water cycle"*

- الماء مصدر طاقة متجددة.
- مياه النهر لا تتجدد (تعود) إلى منبعها عبر السد مباشرة، بل خلال عملية تحدث على الأرض باسم دورة المياه

Exercises on Lesson (4)

1-Choose the correct answer?

1- Water flows through turbines in hydroelectric dams to generate ………energy

a. electrical   b potential   c. solar   d. light

2-In water turbines, the ……….energy of water is changed into electrical energy

a. chemical   b. kinetic   c. .thermal   d. light

3-The reason of flowing of river water downhill is the ………..force

a. pushing   b. friction   c gravitational   d. electrical

4-Using of water to generate electricity depends on places a with strong winds

a. with strong winds   b. where dams are built on rivers

c. with weak winds   d. where boats sail in rivers

5-Both waterfalls and ………..are renewable energy resources

a. wind   b. coal   c. oil   d. fossil fuel

2-Put (√) or (x)

1-Waterfalls are considered as nonrenewable energy resources ( )

2. Electrical energy can be generated from both waterfalls and wind movement ( )

3. Dams are built on rivers to control the wind flow ( )

4-The flow of water can be controlled to generate electricity in dams ( )

3-Correct the underlined words

1-The thermal energy generated by water turbines in dams is known as hydroelectricity (………………..)

2-During the flowing of rivers water downhill, the chemical potential energy of water is converted into kinetic energy (………………..)

3. Dams are built on rivers in order to generate solar energy (………………..)

4-The electrical energy is generated by wind turbines in dams (………………..)

4-Write the scientific term of each of the follows

1. A turbine that convert the energy of falling water into electrical energy (…………..)

2- A type of electrical energy generated by water turbines in dams(………………..)

5-Give reasons for

1-Water turbines are placed in waterfalls areas……………………….………………….

2-Hydroelectric dams are built on rivers…………………………….……..

5- 1- To increase the potential energy of water to generate electricity

2- Because falling water helps water turbines rotate and generate electricity

6-What happens if

1-Water turbines are placed in a dam

……………………………….………………………………………………..…….

2-Potential energy of water increases behind a dam that has water turbines

……………………………….………………………………………………..…….

6- 1- Potential energy of water behind dams is converted into kinetic energy y

2- It converts into more kinetic energy which causes water turbines spin faster y

تحول السطح

Unit (4) shifting surface

There are many forces such as **water** *and* **wind** *that* **shape the rocks** *on .Earth's surface*

Water and wind *can* **break down rocks** *and move them from one place to - another through two processes known as "***weathering***" and "***erosion***"*

هناك العديد من القوى مثل الماء والرياح التي تشكل الصخور على سطح الأرض - .يمكن للمياه والرياح تكسير الصخور ونقلها من مكان إلى آخر من خلال عمليتين تعرفان باسم "التجوية" و "التعرية"



- In **Wadi Nakhr in Oman** *water, wind and other factors cause the different landforms there such as high peaks and also the cracks in the large rocks*

- .في وادي نخر في عمان ، تتسبب المياه والرياح وعوامل أخرى في اختلاف التضاريس هناك مثل القمم العالية وكذلك التشققات في الصخور الكبيرة.

How weathering and erosion shape the Earth's surface

The role of the following factors in weathering process

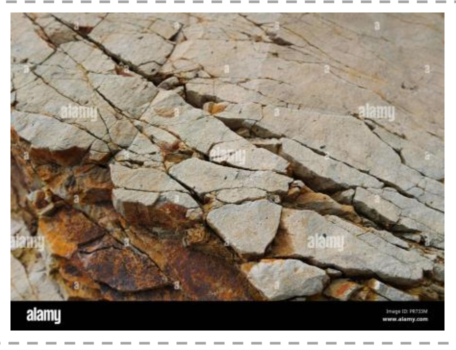
.Water - Wind - Plant roots- Oxygen gas in air- Acid rain -

How deposition process helps in the formation of different landscapes on the Earth's surface

Concept (4.1) Breaking down and moving rocks

LESSON 1

Activity 1





Picture 1 Broken rocks   Picture 2 Coastal rocks

What are the factors changing the Earth's surface? *The surface of the Earth is always changing due to the effect of the wind, water and weather changes.*

Examples In picture 1. *wind can break down rocks and can move the small particles of rocks from an area to another.*

في الصورة 1. يمكن للرياح أن تكسر الصخور ويمكن أن تنقل جزيئات الصخور الصغيرة من منطقة إلى أخرى

In picture 2, *water can change the shape of rocks*

في الصورة 2 ، يمكن أن يغير الماء شكل الصخور

Activity 2

Disappearing Sandcastles اختفاء القلاع الرملية

Natural Erosion التآكل الطبيعي

If a child build a sandcastle on the sea beach, he may notice the disappearance on a part of it or all of it after few hours.

إذا قام طفل ببناء قلعة رملية على شاطئ البحر فقد يلاحظ اختفاء جزء منها أو كلها بعد ساعات قليلة

- *Water and wind are some of the factors that can transport small rocks from one place to another forming a process known as "**erosion**".*

• -تعتبر المياه والرياح من العوامل التي يمكنها نقل الصخور الصغيرة من مكان إلى آخر مما يشكل عملية تعرف باسم "التعرية".

- *The disappearance of the sandcastle (erosion of the sandcastle) is due to the transportation of the sand particles from its place to another by the effect of water and this is considered as an example of **natural erosion***

• "اختفاء قلعة الرمل (تآكل القلعة الرملية) بسبب انتقال جزيئات الرمال من مكانها إلى مكان آخر بفعل تأثير الماء ويعتبر هذا مثالاً على الانجراف الطبيعي

Check your understanding Put (√) or (X)

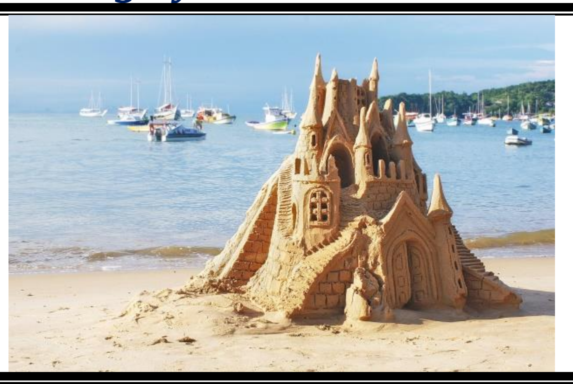
1-The erosion of a sandcastle on a beach is considered as a natural erosion ( )

2-Rocks are formed by breaking down of sand ( )

Activity 3 Sandcastles, Rocks and Canynons القلاع الرملية والصخور والوديان

The Earth's surface is continuously changing. Some changes can be very fast and other changes can be very slow that may take hundreds or millions of years

يتغير سطح الأرض باستمرار .يمكن أن تكون بعض التغييرات سريعة جدًا وقد تكون التغييرات الأخرى بطيئة جدًا وقد تستغرق مئات أو ملايين السنين من التغييرات السريعة

Fast changes	**Slow changes**
in a sandcastle It may completely disappear in few minutes as a result of its hitting by the sea waves	*in coastal rocks There may be some little differenc in its shape after many years if some parts break off*
	

Some similarities between the **sandcastle** and **coastal rocks**:

1. Both have steep needle-like parts
2-Both have sloping sides (inclined sides) at the bottom
3-Water and wind create their shapes .



Canyons وديان

They are deep valleys carved by flowing water
هي عبارة عن أودية عميقة نحتتها المياه المتدفقة

Canyons *are formed due to the slow changes that happened to its rocks over many years.*
A canyon has needle-like parts and slopes at the sides, it is formed by the action of water.

Check your understanding Put (√) or (X)



1-The Earth's surface never change over time . ( )
2-Wind and water can break down rocks into smaller particles ( )

Concept (4.1)

Exercises on Lesson (1)

1-Choose the correct answer?

1-Rocks can be broken down onto small particles by exposing to all of following, except

a. rain water b. wind c. moon d. water waves

2- Disappearing a part a sandcastle due to the effect of sea waves means that all the following have changed, except

a. its shape b. its volume c. its size d. its color

3- Sand is formed due to breaking down of

a. glass b. wood c. rocks d. plastic

4-The deep narrow valley with slopes at its sides and often with water stream flowing through it is known as a

a. canyon. b. mountain c. hill d. river

5-The force of wind plays an important role in erosion, because it can transfer

a. sound energy b. light energy
c. small sized-particles of sand d. very large pieces of rocks

6. The formation of canyons takes

a. few minutes b. few hours c. few days d. many years

2-Choose from column (B) what suits it in column (A)

(A)	(B)
1- Costal rocks	a. are formed due to boiling of water
2- Canyons	b. can be made in few hours from sand particles on seashores
3- Sandcastle	c. deep valleys that are carved by flowing of water
	d. are formed near seas over many years and have needle-like parts and sloping sides

1-…………. 2-………. 3-………….

3-Put (√) or (x)

1-The surface of the Earth changes from time to time ( )
2 Water stream can break down rocks into smaller pieces ( )
3-When large particles of rocks are broken into smaller particles they can be carried by the moving wind ( )
4-If you walk on the seashore and come the next day searching for your footprints, you will find them unchanged ( )
5-All changes that occur on the Earth surface take hundreds of years ( )
6-Water and wind are artificial forces that are responsible for the erosion of sea coasts ( )
7-The changes that are observed in the formation of a canyon are faster than that observed in the disappearance of a sandcastle ( )

4-Write the scientific term of each of the following:

1. The disappearance of a sandcastle as a result of its hitting with the sea waves (……………….)

2-They are deep valleys carved by flowing water. (……………….)

3. It is a model that can be built on seashores using sand and may disappear easily by sea waves (……………….)

5 Complete the following sentences by using the words between brackets

(rocks-wind-water)

1-Air moving from an area to another and has a role in breaking down of rocks into smaller particles is known as………………..

2-The shape of coastal rocks is affected by the forces of…………………. and wind

3. The origin of sand is the breaking down of some types of………………

LESSON 2

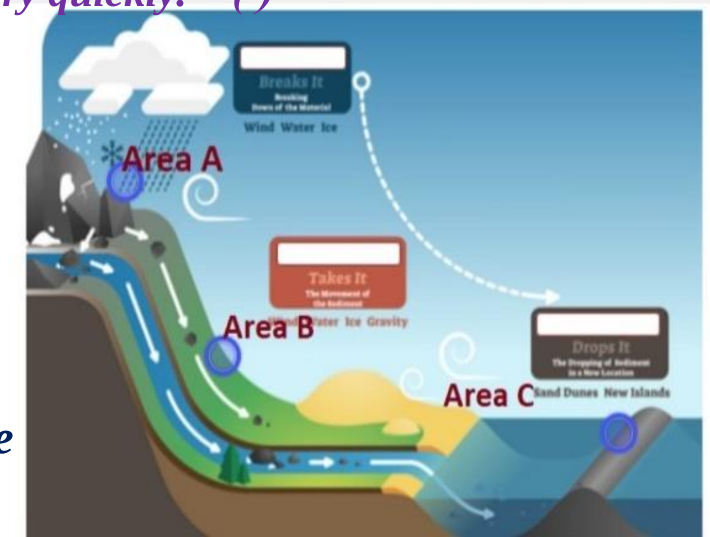
Activity 4

Breaking Down and Moving Rocks

Put (√) or (X)

1-Erosion happens when the rocks get moved away by water or wind ( )
2-Sometimes erosion can happen very quickly. ( )

Shaping the Earth: تشكيل الأرض



In this activity, we are going to understand some processes through which the Earth's surface changes, these processes include weathering, erosion and deposition that can be shown in the following figure

في هذا النشاط ، سوف نفهم بعض العمليات التي من خلالها : تغيرات سطح الأرض ، وتشمل هذه العمليات التجوية والتعرية والترسب التي يمكن أن تظهر في الشكل التالي

:From the previous figure we can observe that

- **Area (A) weathering** (breaking down of large rocks into small particles (sediments),)
- **Area (B) erosion** (the movement of sediments from one place to another)
- **Area (C) deposition** (the dropping of sediments in a new place,)

من الشكل السابق نلاحظ أن: المنطقة (أ) التجوية توضح تكسر الصخور الكبيرة إلى جزيئات صغيرة (رواسب) ، المنطقة (ب الانجراف) توضح حركة الرواسب من مكان إلى آخر ،
• .المنطقة (ج) الترسيب توضح سقوط الرواسب في مكان جديد ،

Note

Sediments could be sand, rocks or soil, and this depends on the environment in which the process takes place

Check your understanding

**:Complete the following sentences **

1.The process that is laying sediments down in a new place called ....
2. The process in which rocks are broken down into smaller particles is knowing as ....

Activity 5 What is Weathering

Weather and weathering
Weather is different from weathering, where

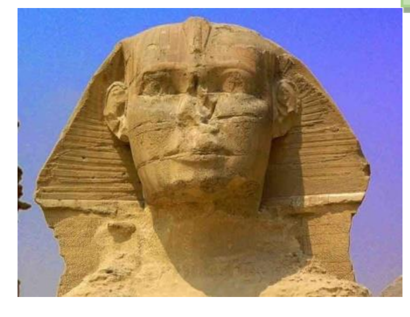
Weather	Weathering
It is the condition of atmosphere at a specific time and place إنها حالة الغلاف الجوي في وقت ومكان محددين	It is the breaking down of rocks on Earth's surface into smaller (tiny) piec إنه تكسير الصخور على سطح الأرض إلى قطع أصغر (صغيرة)
The factors affecting weather temperature, wind, rains,... هناك العديد من العوامل التي تؤثر على الطقس مثل درجة الحرارة والرياح والأمطار ...	The factors affecting weathering wind and water هناك العديد من العوامل التي تسبب التجوية مثل الرياح والمياه
The condition of weather can help us to decide what to wear when we go outside يمكن أن تساعدنا حالة الطقس في تحديد ما نرتديه عندما نخرج	Weathering can change the shape Earth's surface over time يمكن أن تغير التجوية شكل سطح الأرض بمرور الوقت

You can see the effect of weathering in many observations around you such as

1-Breaking of statues
كسر التماثيل

2- Removing of paints of buildings
إزالة دهانات المباني

2- Pulling a wave to the sand of seashores
سحب موجة على رمال الشواطئ







Note *Colder climate and ice are another factors that can change the landscape*

Check your understanding Put (√) or (X)

1-Weather is the breaking down of rocks on Earth's surface into smaller pieces ( )

2-Weathering process effects coastal area. ( )

Activity 6 Types of Weathering

There are two types of weathering which are " **Mechanical weathering** *and* **Chemical weathering**

Mr.-Alifaz .N . Tadrous
01005136959-/-1222978682

A. Mechanical weathering *It is the breaking down of rocks due to the effect of them like wind water, plant roots and temperatures*

التجوية الميكانيكية هي تكسير الصخور بسبب تأثيرها مثل مياه الرياح وجذور النباتات ودرجات الحرارة

1-The role of Wind in Mechanical weathering .

A-Wind pushes the sand from one place to another
B-Friction occurs between sand and rocks
C-Rocks are broken down

1- دور الرياح في التجوية الميكانيكية أ- تدفع الرياح الرمل من مكان إلى آخر
يحدث الاحتكاك ب بين الرمال والصخور يتم تكسير الصخور

2-The role of water in mechanical weathering .

A-Water runs over rocks
B-Water dissolves some substances in rocks
C-Rocks are broken down

2- دور الماء فى التجوية الميكانيكية أ- الماء يجري فوق الصخور ب- الماء يذيب
بعض المواد في الصخور ج-يتم تكسير الصخور

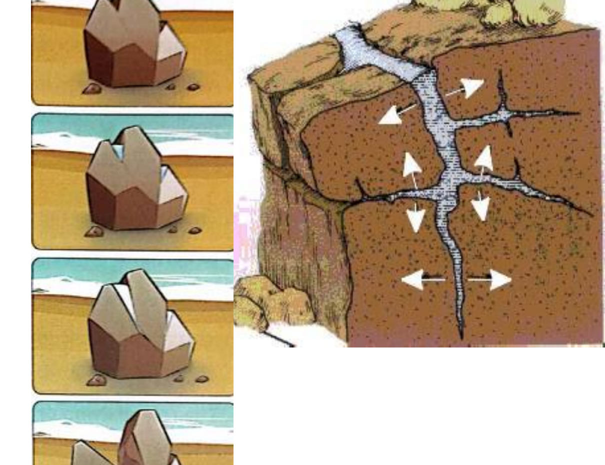


3-The role of plant roots in mechanical weathering .

A-Plant roots grow inside the cracks of rocks
B-Cracks become wider
C-Rocks are broken down

-دور النباتات فى التجوية الميكانيكية .أ- تنمو جذور النبات داخل شقوق الصخور ب- الشقوق تتسع ج- يتم تكسير الصخور

4-The role of temperature in mechanical weathering



A-Water flows into the tiny cracks of rocks
B-When the temperature gets very cold, water freezes forming ice that expands and makes the cracks of rocks become wider
C-When the temperature increases, the ice melts, so water fills newly formed wide cracks again
D-The cycle of freezing of water and melting of ice continues until rocks are broken down

4-دور درجة الحرارة فى التجوية الميكانيكية أ- يتدفق الماء في شقوق الصخور الصغيرة ب- عندما تصبح درجة الحرارة شديدة البرودة ، يتجمد الماء مكونًا جليدًا يتمدد ويجعل شقوق الصخور تتسع . ج- عندما ترتفع درجة الحرارة ، يذوب الجليد ، لذلك يملأ الماء الشقوق العريضة المتكونة حديثًا مرة أخرى د- تستمر دورة تجميد الماء وذوبان الجليد حتى تتكسر الصخور

B. Chemical weathering *It is the change of the structure of rocks due to chemical reactions*

التجوية الكيميائية إنه تغيير في تركيب الصخور بسبب التفاعلات الكيميائية

Chemical weathering *happens due to the chemical reactions of rocks with some other materials such as:*

1. Oxygen *2-Water*
3-Acid rain *4-Acid produced by some living organisms*

1-The role of oxygen in chemical weathering:



Oxygen *of as* **reacts with iron** *of some rocks forming* **red-colored rust**, *this reaction can weaken rocks and* **break** *them* **down** *easily*

1-دور الأكسجين في التجوية الكيميائية: يتفاعل الأكسجين مع الحديد في بعض الصخور مكونًا صدأ أحمر اللون ، وهذا التفاعل يمكن أن يضعف الصخور ويفتت بسهولة

2-The role of water in chemical weathering:



When **water dissolves minerals in a rock** *the dissolved minerals combine again forming* **new shapes** *as in* **limestone caves**

2-دور الماء فى التجوية الكيميائية: عندما يذوب الماء المعادن في الصخر ، تتحد المعادن الذائبة مرة أخرى لتشكل أشكالًا جديدة كما هو الحال في كهوف الحجر الجيري

3-The role of acid rain in chemical weathering :



When the **acid rain fall on rocks**, *it can* **dissolve minerals** *found in these rocks causing the* **break down of rocks**

3-دور المطر الحمضي في التجوية الكيميائية: عندما يسقط المطر الحمضي على الصخور ، يمكن أن يذيب المعادن الموجودة في هذه الصخور مما يتسبب في تكسر الصخور

4-The role of living organisms in chemical weathering



Some tiny **organism** *called "***Lichens***" produce* **acids on rocks** *that* **dissolve minerals** *found in these rocks and* **break them down**

4-دور الكائنات الحية في التجوية الكيميائية تنتج بعض الكائنات الدقيقة التي تسمى "الأشنات" أحماض على الصخور تعمل على إذابة المعادن الموجودة في هذه الصخور وتفكيكها.

Note

Lichens *is tiny plant-like organisms* الأشنات هي كائنات صغيرة تشبه النباتات

Exercises on Lesson (2)

1-Choose the correct answer?

1-All the following are processes that can change the Earth's surface, except

a. digestion b. erosion c. weathering d. deposition

2-The condition of atmosphere including temperature, wind and rains is known as

a. weather b. weathering c. erosion d. deposition

3-Rusting of a statue is an example for the action of……….. process

a. deposition b. erosion c. mechanical weathering d. chemical weathering

4. When water freezes, it expands. This means that

a. it will evaporates b. its temperature increases
c. its volume increases d. its volume decreases

5-All the following are from causes of chemical weathering, except

a. oxygen b. water c. acid rains d. clouds

6-The dropping of sediments in a new place, is known as

a weathering b. deposition c. freezing d. erosion

7-Breaking of statues is an example of

a. erosion b. weathering c. deposition d. sedimentation

8-Limestone caves are formed due to the combination of .

a dissolved minerals b. red-colored rusts
c. living organisms. d. acid rains

9-Lichens produce ………….on rocks that dissolve minerals found in these rocks

a. oxygen b. acids c. water. d. rain

10-Water can produce that affect(s) the shape of the Earth

a mechanical weathering only. b. chemical weathering only
c. both mechanical and chemical weathering
d. neither mechanical nor chemical weathering

2-Put (√) or (x)

Wind can be considered one of the factors that cause weathering.(..)
2. Plant roots help in the formation of rocks. .(…)
3. Limestone caves are formed by the action of mechanical weathering .(…)
4-Friction force between rocks and sand carried by wind may cause weathering(….)
5-When iron in rocks rusts, the rock becomes more stranger. (....)
6. There are many types of sediments like sand. rocks and soil .(…..)
7-The movement of sediments from one place to another is known as weathering (...)
8. Shaping the Earth is usually start by deposition process (…..)
9-All physical factors of mechanical weathering lead to breaking down of rocks (...)
10. Oxygen in air reacts with iron of some rocks forming green-colored rust (...)

3-Write the scientific term of each of the following

1-Process in which rocks are broken down into smaller particles. (……………..)

2-Process in which small broken rocks move from a place to another by the help of wind or water (…………………..)

Process in which the sediments are dropped in a new location by the action of wind, water and gravity (………..………..)

4. Part of plant grows inside cracks of rocks causing its weathering (………..………..)

5-The condition of atmosphere at a specific time and place. (……………..)

6. It is a type of weathering through which acids of lichens dissolve minerals of rocks (………..………..)

7-It is a type of caves that is formed when dissolved minerals of rocks combine again in new shapes (…………………..)

8-It is a process through which water forming ice in cracks of rocks. (…………………..)

9. A gas in air combines with iron of some rocks and causes its weakness. (…………………..)

4-Give reasons for

1-Iron in rocks may rust

……………………………………………………………………………….

2-Water play an important role in the formation of limestone caves

……………………………………………………………………………….

4- 1- *Due to the reaction between iron and oxygen of air*

2- *Because water dissolves minerals in rocks,*

5-What happens if

1-Lichens growing on rocks produce acids

……………………………………………………………………………….

2-A red-colored rust is formed on some rocks

……………………………………………………………………………….

5- 1- *The minerals of these rocks dissolve causing their breaking down*

2- *This rocks become weak and can be break down easily*

LESSON 3
Activity 8
Modeling Mechanical and Chemical Weathering

-**Weathering of rocks** *is a slow natural process that often takes many year to see its effect*

- In this activity we will model and explore both mechanical and chemical weathering to understand the similarities and differences between them

Tools






Biscuits (crackers) *Piece of cloth* *Antacid tablet in a cup of water*

قرص مضاد للحموضة في كوب ماء

Steps

1-Crush some biscuits inside the piece of cloth with your hands for few seconds

سحق بعض البسكويت داخل قطعة القماش بيديك لبضع ثوان

2-Put some other biscuits in a cup of water contains antacid

2-نضع بعض البسكويت في كوب ماء يحتوي على مضاد للحموضة.

Observations ملاحظات

1-In the first step, *biscuits are broken down into smaller parts, but they still like biscuits*

2-In the second step, *biscuits dissolve and mix with water containing antacid causing a formation of different material*

1-في الخطوة الأولى ، يتم تقسيم البسكويت إلى أجزاء أصغر ، لكنها لا تزال تحب البسكويت

2-في الخطوة الثانية ، يذوب البسكويت ويخلط بالماء الذي يحتوي على مضاد للحموضة التسبب في تكوين مادة مختلفة

Conclusions الاستنتاجات

1-In the mechanical weathering, *the substance is broken into smaller parts without changing its nature*

2-In the chemical weathering *the substance is broken into smaller parts and another substance is formed as a result of chemical reactions.*

3. Chemical weathering *causes greater changes to substances than that happen in mechanical weathering*

1-في التجوية الميكانيكية ، يتم تكسير المادة إلى أجزاء أصغر دون تغيير طبيعتها

2-في التجوية الكيميائية ، يتم تكسير المادة إلى أجزاء أصغر وتتكون مادة أخرى نتيجة تفاعلات كيميائية .

3-.تتسبب التجوية الكيميائية في حدوث تغيرات في المواد أكبر من تلك التي تحدث في التجوية الميكانيكية

Note ملحوظة

Scientists use models to recreate the weathering process to understand it better, because weathering takes along time in real life, and the rocks we can see now have been weathered over hundreds of years

يستخدم العلماء النماذج لإعادة إنشاء عملية التجوية لفهمها بشكل أفضل ، لأن التجوية تستغرق وقتًا طويلاً في الحياة الواقعية ، والصخور التي يمكننا رؤيتها الآن قد تم التغلب عليها على مدى مئات السنين

Check your understanding (complete by choosing)

1-The chemical weathering makes……..changes than the mechanical weathering (weak-great-little)

2. Occurrence of weathering takes …………in real life (some hours-few days-hundreds of years)

Activity 10 Weathering

there are two types of which are mechanical weathering and chemical weathering.



Deduce *if this landform shown in front of you is affected by mechanical weathering or chemical weathering*

The rocks are broken into smaller pieces with different shapes of the same material

استنتج ما إذا كان هذا الشكل الأرضي الذي يظهر أمامك يتأثر بالعوامل الجوية الميكانيكية أو التجوية الكيميائية يتم تكسير الصخور إلى قطع أصغر بأشكال مختلفة من نفس المادة

This process is similar to *that happened to biscuits broken by hands in the previous activity, this leads us to conclude that the landform shown above has been mechanically weathered over me*

هذه العملية مشابهة لما حدث للبسكويت المكسور بأيدي في النشاط السابق ، وهذا يقودنا إلى استنتاج أن الشكل الأرضي الموضح أعلاه قد تم تجويته ميكانيكيًا فوقي.

Check your understanding Put (√) or (X)

1-In both mechanical weathering and chemical weathering, the substance is broken down into smaller parts ( )

2-A new substance is formed if mechanical weathering occurs ( )

3-In mechanical weathering the rocks are broken into smaller pieces with different shapes and new materials ( )

Exercises on Lesson (3)

1-Choose the correct answer?

1-The breaking of rocks into smaller particles without changing their properties called

a. mechanical weathering *b. chemical weathering*
c. deposition *d. erosion*

2. Which of the following does not cause mechanical weathering?

a. Roots of plants *b. Acid rains* *c. Wind movement* *d. Water movement*

3. The breakdown of rocks either mechanically or chemically is called

a. rusting *b. weathering* *c. deposition* *d. erosion*

4. Crushing a piece of biscuit by hands is similar to………… of rocks

a. mechanical weathering *b. chemical weathering*
c. erosion *d. deposition*

2-Put (√) or (X)

1-Roots of plants can slowly grow over time through small cracks in rocks causing chemical weathering (…)
2-When water freezes, its volume increases (…)
3. Reaction between oxygen with the iron of some rocks causes its chemical weathering (…)
4-Grinding of biscuits by hands into fine powder has the same effect of mechanical weathering of rocks (…)

3-Write the scientific term of each of the following

1-A process in which a large rock is broken into small pieces (……………..…)
2-A process that takes place in rocks and can be explained by pressing strongly on cubes of sugar until it becomes a powder (……………..…)
3. A process in which the colors of paints of houses are changed as a result of falling of acid rains (……………..…)

4-Complete the following sentences:

1. Cracks caused by freezing of water and melting of ice represent…………… weathering
2-In the ……………….weathering, the chemical structure of rocks doesn't change
3-Putting some biscuits in a cup of water that contains antacid represents ……………….weathering of rocks
4-Formation of limestone caves is an example of……………….weathering

LESSON 4

Activity 11 Erosion

Put (√) or (X)

1. Earth surface is reshaped through some processes like weathering erosion and deposition ( )

2. After breaking down of rocks into smaller particles, they never move from a place to another ( )

Erosion *the small particles (sediments) of sand, soil and rocks are moved to other places by wind, water and gravity*

التعرية هي العملية التي تنتقل فيها الجزيئات الصغيرة (الرواسب) من الرمل والتربة والصخور إلى أماكن أخرى بالرياح والمياه والجاذبية

Notes

1-Sediments are small solid materials such as sand, soil and small particles of rocks.

2. Sediments are moved by wind and water and settles on the surface of land or the bottom of water bodies such as lakes and seas

1-الرواسب عبارة عن مواد صلبة صغيرة مثل الرمل والتربة وجزيئات الصخور الصغيرة .2 .تتحرك الرواسب بفعل الرياح والمياه وتستقر على سطح الأرض أو قاع المسطحات المائية مثل البحيرات والبحار.

Action of wind erosion عمل الرياح فى التعرية

A gentle wind may carry sand grains for a short distance (1 meter), while stronger wind and hurricanes carry them for a longer distance

قد تحمل الرياح اللطيفة حبيبات الرمل لمسافة قصيرة (حوالي متر واحد) ، بينما تحملها الرياح القوية والأعاصير لمسافة أطول.

Action of water erosion عمل الماء فى التعرية

Rivers and floods carry sand, soil and rocks downstream

Sea waves pull sand away from beaches

Rain washes away the soil of farms that locate beside downhill

تحمل الأنهار والفيضانات الرمال والتربة والصخور في اتجاه مجرى النهر تسحب موجات البحر الرمال بعيدًا عن الشواطئ تغسل الأمطار تربة المزارع التي تقع بجانب المنحدرات

Action of gravity erosion عمل الماء فى التعرية

The broken weathered rocks in a mountain can be pulled down at mountainsides by the effect of gravity

يمكن هدم الصخور المكسورة في الجبال عند سفوح الجبال بتأثير الجاذبية



Formation of sedimentary rocks

- Sediments are mixed with mud and remains of plants and animals at the bottom of oceans, lakes and in deserts forming layers

Over long period of time, more and more layers press down forming sedimentary rocks.

كوين الصخور الرسوبية -تختلط الرواسب بالطين وبقايا النباتات والحيوانات في قاع المحيطات والبحيرات والصحاري تشكل طبقات على مدى فترة طويلة من الزمن ، تضغط المزيد والمزيد من الطبقات لأسفل لتشكيل الصخور الرسوبية.

Note

You can see the evidence left by erosion after hundreds, thousands or millions of years from its occurrence

Glaciers *are rivers of ice or snow that move slowly over the Earth's surface.*

Glaciers *can help in erosion as they pick up and carry large rocks and soil*

Check your understanding Put (√) or (X)

1-Floods is one of the factors that cause water erosion.(….)

2. Gravity does not affect the small rocks that have been broken down from mountains .(….)

Activity 12 Deposition

Rocks can be broken *into* **smaller pieces** *through* **weathering** *process, and this small places are* **carried away through erosion** *process*

يمكن تقسيم الصخور إلى قطع أصغر من خلال عملية التجوية ، ويتم نقل هذه الأماكن الصغيرة بعيدًا من خلال عملية التعرية

-**After erosion**, *the* **deposition** *process is the next stage that shows where these pieces of rocks might end up*

-**When the wind blows**, *it picks up sand into the air*

As the **wind moves**, *the sand may travel with it to a new place*

When the wind stops *blowing, the* **sand falls** *onto the ground and deposits*

-بعد التعرية ، تكون عملية الترسيب هي المرحلة التالية التي تظهر أين يمكن أن تنتهي هذه القطع من الصخور -عندما تهب الرياح تلتقط الرمال في الهواء ،

مع تحرك الريح ، قد يسافر الرمل معها إلى مكان جديد عندما تتوقف الرياح عن هبوبها ، تسقط الرمال على الأرض وتترسب

Deposition الترسيب

It is the process of laying down of sediments after its erosion

هى عملية ترسب الرواسب بعد تآكلها

examples show how deposition process affects the shape of land

بعد تآكلها الآن ، دعنا نرى بعض الأمثلة التي توضح كيف تؤثر عملية الترسيب على شكل الأرض

Action of water in deposition عمل الماء في الترسيب

Running water in rivers *play an important role in deposition process such as*

A river can **deposite a sandbar** *along its banks (sides)*

When a river carries *sediments meet a sea, these* **sediments are deposited** *there forming a* **delta** *such as the* **Nile Delta**

تلعب المياه الجارية في الأنهار دورًا مهمًا في عملية الترسيب مثل يمكن أن يرسب النهر شريطًا رمليًا على طول ضفتيه (جوانب)
عندما يلتقي نهر ما بالرواسب مع البحر ، تترسب هذه الرواسب هناك وتشكل دلتا مثل دلتا النيل



Delta It is a fan-shaped (triangle-shaped) mass of mud and other sediments that forms where a river enters a large body of water

دلتا إنها كتلة من الطين والرواسب الأخرى على شكل مروحة (على شكل مثلث) تتشكل حيث يدخل النهر إلى مسطح مائي كبير

Sea waves also move sand from one place to another new place where it deposits there

تقوم موجات البحر أيضًا بنقل الرمال من مكان إلى مكان جديد آخر حيث تترسب هناك

Action of wind in deposition عمل الرياح في الترسيب

Weak and strong winds play an important role in deposition process such as

Weak winds رياح ضعيفة	**Strong winds** رياح قوية
They can form small sand dunes يمكن أن تشكل كثبان رملية صغيرة	They can form large sand dunes يمكن أن تشكل كثبان رملية كبيرة
Example Sand dunes on a beach مثال الكثبان الرملية على الشاطئ	Examples Sand dunes In- Western Desert in Egypt - Rub Al Khali in the Arabian Peninsula أمثلة -الكثبان الرملية في -الصحراء الغربية فى مصر -رب الخالي في الجزيرة العربية





Check your understanding

Choose from column (B) what suits it in column [A

(A) Deposition factors	(B) Its effect
1- Wind in the desert	a. Formation of a delta
2- A river meets the sea	b. Formation of sand dunes

1- ……………….. 2- ……………………

Exercises on Lesson (4)

1-Choose the correct answer?

1-Moving of sediments from a place to another……….. represents process

a. weathering b. photosynthesis c. erosion d deposition

2-gentle wind may carry sand for a……… distance, but the hurricanes can carry sand for a…………. distance

a. long-shorter b. long-longer c. short-shorter d. short-longer

3-A………. is formed where rivers meet a sea

a. delta b. mountain c. volcano d. canyon

4-Which of the following arrangements is correct about reshaping Earth's surface?

a. Erosion → Weathering → Deposition
b. Erosion → Deposition → Weathering
c. Deposition → Erosion → Weathering
d. Weathering → Erosion → Deposition

5-Each of the following plays a role in erosion process, except

a, blowing wind b. water floods c. sunlight d. Earth's gravity

6-Gentle wind can carry……………. for a short distance

a. sedimentary rocks b. sand grains
c. a large body of water d. a big mass of mud

7-Pulling sand away from beaches by sea waves, is considered as an example of….

a. mechanical weathering b. chemical weathering
c. erosion d. deposition

8. Pulling down broken weathered rocks at mountainsides occurs by the effect of

a gentle wind. b. freezing of water c. Earth's gravity d. chemical weathering

9-Sedimentary rocks is formed of

a. one layer of sediments b. many layer of sediments
c. water mixed with sand d. water mixed with soil

10. When a river that carries sediments meet a sea ……..is formed

a. a layer of sedimentary rock b. a triangle-shaped delta
c. a small sand dune d. a large sand dune

2-Put (√) or (X)

1-The effect of erosion may last for hundreds of years (…)
2-Sea waves may cause erosion of beaches (…)
3. Gravity pulls rocks down the mountainsides causing its erosion (…)
4-Deposition process never change the shape of the land. .(…)
5. Sediments are usually liquid materials that settle on the surface of land (…)
6-Strong wind and hurricanes carry sand grains for a short distance. (…)
7. Blowing of wind and flooding of water play an important role in erosion (…)
8-Sedimentary rocks are formed in a short period of time. (…)
9. Nile delta is a triangle-shaped mass of mud and other sediments. (…)
10. Gentle winds can form large sand dunes like that in Egyptian western desert(…)

3- Write the scientific term of each of the following

1-It is the process by which natural forces move weathered rocks and soil from one place to another (………………)

2-It is the process in which weathered rocks and soil are laying down or dropped by wind, water or gravity (………………)

3. A fan-shaped (triangular) mass of sediment that is formed where a river enter a larger body of water like seas (………………)

4-A hill of sand created by the wind (………………)

5-They are small solid materials such as sand, soil and small rocks that by water to another place (………………)

6-The force that pulls down broken weathered rocks at mountainsides (………………)

4-Complete the following sentences

1-Wind, ………….and gravity are natural factors that control erosion processes

2-Sand grains …………..on the ground when the wind carrying it stops

3-Sediments are mixed with the remains of ……… and……………forming layers at the bottom of oceans and lakes

4-Blowing of strong …………..in the desert may form large sand dunes

5-Strong wind and hurricanes carry……………… for a long distance

6-When you see a mountain which is formed of many layers pressing each others, this means that it is formed of…………………..rocks

7-Gentle winds can form small like ……………….that present at sea bead

5- What happen when ……?

1-More and more layers of sediments settle on the bottom of oceans, lakes and in desert

……………………………………………………………………………………….

2-A river carries sediments meet a sea

……………………………………………………………………………………….

5- 1- *The sedimentary rocks are formed*_

2- *A delta is formed*

LESSON 5

Activity 13 Evidence of Change دليل على التغيير

Put (√) or (X) 1-The erosion process happen very slow. ( )

2. The deposition process happen without erosion ( )

The surface of the Earth is continuously changing from time to time. There are three processes that have an important role in changing the Earth's surface, which are weathering, erosion and deposition.

Weathering: wind or water wears down rocks or the shape of landform is changed by mechanical or chemical processes

التجوية: تحدث عندما تفتت الرياح أو الماء الصخور أو يتغير شكل التضاريس بواسطة عمليات ميكانيكية أو كيميائية

Erosion It is caused when wind or water moves materials from one place to another

التعرية: يحدث عندما تنقل الرياح أو الماء المواد من مكان إلى آخر

Deposition : It occurs when eroded materials stop moving and settle on a surface, often forming layers over time

الترسب: يحدث عندما تتوقف المواد المتآكلة عن الحركة وتستقر على سطح ، وغالبًا ما تشكل طبقات بمرور الوقت

By the action of the three previous processes we can observe changes in the Earth's surface such as

Sand dunes which are small hills of sand Found in a desert or on top of a beach

من خلال عمل العمليات الثلاث السابقة يمكننا ملاحظة التغييرات في سطح الأرض مثل

الكثبان الرملية وهي تلال رملية صغيرة توجد في الصحراء أو على قمة الشاطئ



Delta a piece of land shaped like a triangle that is formed when a river enters a large body of water such as a sea or an ocean

الدلتا عن قطعة أرض على شكل مثلث يتشكل عندما يدخل نهر إلى جسم مائي كبير مثل البحر أو المحيط

Erosion and **deposition** are **linked processes,** erosion does not occur in one place without deposition in another, and vice versa

التآكل والترسيب عمليتان مترابطتان ، لا يحدث التآكل في مكان واحد دون ترسب في مكان آخر ، والعكس صحيح.

Check your understanding

Complete the following sentences using the words below

(erosion-weathering - deposition)

1-The process in which rocks are broken down to form sediments is called…

2. The process in which the eroded rocks stop moving and settle on a surface is called ……

3. The process in which sediments are transported by water or wind from a place to another is called …

Mr.-Alifaz .N .Tadrous
01005136959-/-1222978682

Exercises on Lesson (5)

1-Choose the correct answer?

1. As a result of breaking down……………. sand is formed

a. rubber b. plastic c. rocks d. glass

2-Conditions of atmosphere including temperature, wind and rains is known as

a. weather b. weathering c. deposition d. erosion

3-The breakdown of rocks either mechanically or chemically is known as

a. photosynthesis b. weathering. c. erosion d. deposition

4-When a river meets a sea or an ocean, a …………. is formed.

a. canyon b. volcano c. mountain d. delta

2-Put (√) or (X)

1-The surface of the Earth never changes (….)

2-Limestone caves are formed as a result of chemical weathering (….)

3-When water freezes, its volume decreases (….)

3-Write the scientific term of each of the following

1-They are deep valleys carved by flowing water (……………....)

2. Process in which small broken rocks move from a place by the help of wind or water (……………....)

3-Process in which the moving sediments are dropped in a new place (……………....)

4-Complete the following sentences:

1. The origin of sand is the breaking down of some types of………………

2-The type of weathering in which the rocks are broken down due to the presence of plant roots is known as …………. weathering.

3. Cracks caused by heating and cooling of water represent a type of weathering known as……………… weathering

4-When strong ………..blow in the desert, large sand dunes are formed

Concept (4.2) Changing landscapes

LESSON 1

Activity 2 Canyons وديان

Look at the opposite picture, then Put (√) or (X)

1. The flow of water on the sand can change its shape ( )

2-The sand particles remain in there positions when the water flows over them ( )



When the water is moving over the sand, *it pushes some of the sand out of the way*

-As the **water moves the sand**, *it leaves an impression where the water flowed*

-This is the same idea of **canyons formation**.

-**Canyons** *are formed due to erosion by water for a period of time, as water can wear away landscapes and move sediments*

عندما يتحرك الماء فوق الرمال ، فإنه يدفع بعض الرمال بعيدًا عن الطريق –

عندما يحرك الماء الرمل ، فإنه يترك انطباعًا عن مكان تدفق الماء -هذه هي نفس فكرة تكوين الأخاديد– .

تتشكل الوديان بسبب التعرية بالمياه لفترة من الزمن ، حيث يمكن أن تتسبب المياه في تآكل المناظر الطبيعية وتحريك الرواسب

Canyons differ *in their* **colors**, **texture** *and* **shape** *of rocks*

, تختلف الوديان في ألوانها وتركيبها وشكلها الصخري





Wadi Nakhr canyon *in Oman its color is* **brown** *and* **black**

Small Canyon in Thailand *has a* **reddish color**

، - وادي نخر في عمان لونه قفل بني ولكن الوادي الصغير في تايلاند له لون قريب إلى الاحمر.



- **Canyons can have V-shape as in colored canyons** *in* **Sinai and Wadi Rum** *canyon in* **Jordan**

-يمكن أن يكون للوديان شكل V كما هو الحال في الوديان الملونة في سيناء ووادي رم في الأردن.

Check your understanding Put (√) or (X)

1. Canyons are formed due to long term erosion ( )

2-All canyons have the same shape ( )

3. Wadi Nakhr canyon in Oman has V-shape ( )

تغيير المناظر الطبيعية Activity 2 Changing Landscapes

The formation of landforms help predict future changes:

Example Canyon formation تكوين الوادي

Small canyon at the beginning of its formation by the effect of a stream of water,

- الوادي الصغير في بداية تكوينه بتأثير مجرى مائي ،

Trees *and* **other plants** *that are growing on* **both sides of canyon,** *need water to grow.*

-الأشجار والنباتات الأخرى التي تنمو على جانبي الوادي تحتاج إلى الماء لتنمو

The sides *are* **gently sloped** *due to the help of water in wearing (eroding) the sides down*

الجوانب منحدرة بلطف بسبب مساعدة الماء في ارتداء (تآكل) الجوانب لأسفل

Water streams *that flow over flat land will probably form small canyons*

The small canyon *shown above could get deeper if it rained a lot, and water ran through it again*

.من المحتمل أن تشكل تيارات المياه التي تتدفق على الأرض المسطحة أودية صغيرة يمكن أن يصبح الوادي الصغير الموضح أعلاه أعمق إذا أمطرت غزيرة ، وجرت المياه من خلاله مرة أخرى

Beside canyons, there are many other forms of landforms such as


Mountain


Dunes


Valley

Check your understanding Complete the following sentences:

1. The canyon is formed by the effect of …………..

2-The sides of ....are gently sloped

Activity 4 Landscapes in Your Environment

Imagine that you go to your school after a rainy day, you can see some changes in the school landscape due to some processes happened, for example

You can see rounded and worn small rocks and that is an evidence of weathering process

يمكنك رؤية صخور صغيرة مستديرة ومتهالكة وهذا دليل على عملية التجوية



You can see an area with small canyons *where soil was washed away after heavy rain and that is an evidence of erosion process.*

•يمكنك رؤية منطقة بها وديان صغيرة حيث جرفت التربة بعد هطول أمطار غزيرة وهذا دليل على عملية التعرية.

You can see a patch of sand *in the playground after heavy rain and that is an evidence of deposition process.*

•يمكنك رؤية بقعة من الرمل في الملعب بعد هطول أمطار غزيرة وهذا دليل على عملية الترسيب.

You can see the same processes happen in large landscapes in nature, where:

School landscape منظر المدرسة	Large landscape in nature منظر طبيعي كبير في الطبيعة
Weathering process	
Instead of weathering of small rocks at your school playground بدلًا من تجوية الصخور الصغيرة في ملعب مدرستك 	*you can see big rocks of a mountain were broken off* يمكنك أن ترى صخور جبل كبيرة قد تحطمت 
Erosion process	
Instead of **small canyons** *in the Land of your school* بدلاً من الأخاديد الصغيرة في أرض مدرستك 	*you can see the* **walls of a canyon** *were eroding by the effect of a river movement* يمكنك أن ترى جدران الوادي تتآكل بفعل حركة النهر 
Deposition process	
Instead of a **patch** *of sand at your school playground* بدلاً من بقعة من الرمل في ملعب مدرستك 	*you can see a* **river** *makes new land from sediments by deposition* يمكنك أن ترى نهرًا يصنع أرضًا جديدة من الرواسب عن طريق ترسيب 

Note *It might be useful to recognize signs of weathering, erosion and deposition because it may help in building houses in safe places, where:*

•People must not build a house on a hill that is eroding

People must not build a house very close to a river, as if the path of a river is changed, it causes erosion and deposition of the house

قد يكون من المفيد التعرف على علامات التجوية والتعرية والترسب لأنها قد تساعد في بناء المنازل في أماكن آمنة ، حيث:
• لا يجب على الناس بناء منزل على تلة آخذة في التآكل .يجب ألا يبني الناس منزلًا قريبًا جدًا من النهر ، كما لو تغير مسار النهر ، فإنه يتسبب في تآكل المنزل وترسبه.

Check your understanding

►Put (√) or (x)

1. We can't see any changes in our environment after raining ( )

2. In nature only weathering takes place but in small landscapes deposition and erosion happen ( ).

Concept (4.2)

Exercises on Lesson (1)

1-Choose the correct answer?

1-A canyon may be formed due to the effect of .

a. erosion and deposition b. weathering and erosion
c. weathering and deposition d. deposition only

2-A canyon can be formed by the effect of .

a. water only b. wind only c. water and wind. d. water and sunlight

3-A canyon may take ……………of years to be formed

a. hundreds b. tens c. millions d. couple

4-If the rain falls over a small canyon for several times per year .

a its depth increases b. its depth decreases c. it becomes flat d. it is not be affected

5-Wadi Nakhr in Oman is formed because water move …….away by the effect of erosion

a. sunlight b. wind c. sediments d. mountains

6-Among canyons which has V-shape are .

a. Wadi Nakhr and the Small Canyon b. the Colored Canyon and Wadi Rum
c. the Small Canyon and the Colored Canyon d. Wadi Nakhr and Wadi Rum

7-Among the evidences for the beginning of formation of small canyon by the effect of running water is

a. the deep sloped of its sides b. trees and plants that are growing on its sides
c. the little amount of rains that flow over it.
d. the rocks and sediments that are found on its sides

8. If the big rocks of a mountain were broken off, this is an evidence of

a weathering process only b. erosion process only
c. weathering and erosion processes. d. weathering and deposition processes

2-Put (√) or (X)

1. The shape of rock will be rounded and worn due to the effect of deposition process (…)
2. A canyon may be formed due to the effect of wind weathering and erosion (….)
3. Wadi Rum in Jordan is an example of dune (….)
4. When the water is moving over the sand, it leaves an impression on it. (….)
5. A canyon is formed due to the effect of water stream on a flat land (….)
6. A canyon may take one year only to be formed. (….)

3 Write the scientific term of each of the following

1. It is the landform that is formed by the effect of weathering and erosion due to wind, water or other factors. (………………..….)
2. The two processes that have the main role in formation of canyon (………….)

4- Give reasons for:

1. Trees and other plants are growing on both sides of small canyons.
2. It might be useful to recognize signs of weathering, erosion and deposition.

5- 1- *Due to flow of water stream which is needed by plants to grow*
2- *for building houses in safe places*

LESSON 2

Activity 6 Canyon Formation تكوين الوادى

Canyons *are special types of valleys that have steep sides*
Many valleys including canyons are formed by the same way where
الوديان هي أنواع خاصة من الوديان ذات جوانب شديدة الانحدار -تتشكل العديد من الوديان بما في ذلك الأخاديد بنفس الطريقة حيث

Gravity *pulls rainwater downhill forming small streams*
تسحب الجاذبية مياه الأمطار إلى أسفل المنحدرات وتشكل تيارات صغيرة

These small streams *join together forming a bigger stream (river)*
تتحد هذه التيارات الصغيرة معًا لتشكل تيارًا أكبر (نهر)

The water of the river flows fast *across the land and erodes a pathway through the landscape that makes the river carve out a valley*


تدفق مياه النهر بسرعة عبر الأرض وتؤدي إلى تآكل المسار عبر المناظر الطبيعية التي تجعل النهر يشق واديًا

Notes

1-The shape of a valley depends on: *A- The types of rocks exist in landscape*
B-the speed, age and size of river that form the valley
2-Big streams or rivers cause *more erosion than small streams.*
3. Rivers that flow fast cause *more erosion than rivers with slow flow*
1-شكل الوادي يعتمد على: أ- أنواع الصخور الموجودة في المناظر الطبيعية ب- سرعة وعمر وحجم النهر الذي يتكون منه الوادي
2-التيارات أو الأنهار الكبيرة تسبب تآكلا أكبر من التيارات الصغيرة .3 .الأنهار التي تتدفق بسرعة تسبب تآكلا أكثر من الأنهار ذات الجريان البطيء

Grand Canyon وادى جراند

It is located in United States of America
It is very large and steep canyon, and it contains many layers of rocks.
This canyon contains a river in its bottom.
تقع في الولايات المتحدة الأمريكية إنه واد كبير وشديد الانحدار ، ويحتوي على طبقات عديدة من الصخور .يحتوي هذا الوادي على نهر في قاعه.

Formation of the Grand Canyon

Over long period of time (millions of years), the water of the river there flowed so quickly due to travelling of the river down a steep slope
على مدى فترة طويلة من الزمن (ملايين السنين) ، تدفقت مياه النهر هناك بسرعة كبيرة بسبب انتقال النهر إلى منحدر حاد

The water of the river eroded the rock and out them deeply
أدت مياه النهر إلى تآكل الصخور وإخراجها بعمق

The fast flow of water eroded a lot of sediment and carry them away that leads to the formation of the Grand Canyon
أدى التدفق السريع للمياه إلى تآكل الكثير من الرواسب وحملها بعيدًا مما أدى إلى تكوين وادى جراند





Exercises on Lesson (2)

1-Choose the correct answer?

1-The rainwater gather in small streams due to the………. downhill .

a. pushing force of gravity *b. pulling force of gravity*
c. pushing force of friction *d. pulling force of friction*

2-……….can erode valleys and form canyons across them

a. Rivers *b. Mountains* *c. Dunes* *d. Rocks*

3-The shape of the valley depends upon all of the following factors, except .

a. type of rocks *b. speed of the river* *c size of rocks.* *d. size of the river*

4-When the water of a river travels downhill on a steep slope, its speed

a. stays constant *b. decreases to half* *c. decreases to quarter* *d. increases*

5-Among the examples of fast changes of landforms is the formation of .

a mudslides *b. canyons* *c valleys* *d. mountains*

6-Rivers that flow fast can cause more ………than rivers with slow flow

a. chemical weathering *b. erosion* *c. deposition* *d. formation*

2-Put (√) or (X)

1-The Grand Canyon in USA is very large and steep (….)
2. Rivers cause less erosion of rocks than small streams (….)
3-The river movement can take the rocks away around mountains (….)
4-The Grand Canyon took short period of time to be formed . (….)
5- Canyon is a type of dunes which has steep sides (….)

3-Write the scientific term of each of the following

1-It is a special type of valleys which its sides are steep (……………….)
2-It is a very large and steep canyon which is found in United States of America (……………….)

4-Complete the following sentences by using the words below:

(speed-wind-sediment-valleys-gravity)

1-The sides of a mountain could be broken down by the effect of………….. and ………………. weather erosion
2-Canyon is a special type of………… which its sides are steep
3-When the water of a river travels down a steep slope, its ……….. increase
4-The force of water stream can erode a lot of……………. of a mountain and carry them away
5. Rainwater is pulled downhill forming small streams due to the effect of…………

5-Give a reason for the following

Mudslides represent a fast change in the landscape…………………………………………

5- - *Because it is formed due to flooding rain in a short period of time*

6-What happens ……?

A river erodes the sediments of a mountain over a long period of time

…………………………………………………………………………………………………

6- - *A canyon may be formed*

LESSON 3

Activity 7 Canyons and Valleys الوديان والوادي

Put (√) or (X) 1. When water flows quickly, it causes more erosion ( )

2-Canyons don't have steep sides ( ).

The canyons are a special type of valleys

Now, let's study the similarities and differences between canyons and va

Canyons	Valleys
the areas were eroded in mountains Their walls are usually very high (have great depth), steep, narrow and consist of many layers of rocks وهي المناطق التي تآكلت في الجبال عادة ما تكون جدرانها عالية جداً (لها عمق كبير) وشديدة الانحدار وضيقة وتتكون من طبقات عديدة من الصخور	lowland an areas in between mountains They have gently sloped sides that usually surround a flat plain نها مناطق منخفضة بين الجبال لها جوانب منحدرة بلطف والتي عادة ما تحيط بالسهل المسطح
Similarities Both of them can be formed by rivers or streams Both of them often have rivers or streams flow through the lowest points كلاهما يمكن أن يتشكل من الأنهار أو الجداول كلاهما غالبًا ما يكون به أنهار أو تيارات تتدفق عبر أدنى النقاط	

.





Geologists study the layers of rocks in the canyon walls to learn about kinds living things existed there long ago

يدرس الجيولوجيون طبقات الصخور في جدران الوادي للتعرف على أنواع الكائنات الحية التي كانت موجودة هناك منذ زمن بعيد

:Check your understanding Complete the following sentences

1-Valleys and canyons often have……………... .flow through the lowest points

2-Geologists study the layers of rocks in the canyons to learn about ……….. .existed there long ago

Activity 8 Delta Formation تكوين الدلتا

Valleys and canyons are formed **by weathering** and **erosion** processes.
but **deltas** are formed by **deposition** process
تتكون الوديان والأودية من خلال عمليات التجوية والتعرية .لكن الدلتا تتكون من خلال عملية الترسيب

Streams or **rivers** which flow fast **carry sediments which called silt**
تحمل الجداول أو الأنهار التي تتدفق بسرعة رواسب تسمى الطمى

As the **river water** flows along its journey, it **carries more and more sediments** until the river water **becomes full of sediments**
عندما تتدفق مياه النهر على طول رحلتها ، فإنها تحمل المزيد والمزيد من الرواسب حتى تمتلئ مياه النهر بالرواسب..

When the speed of the river water decreases, it **drops** the **sediments** (silt) which it is carrying **forming deltas**
عندما تنخفض سرعة مياه النهر ، تسقط الرواسب (الطمي) التي تحملها مكونة دلتا.

Small deltas

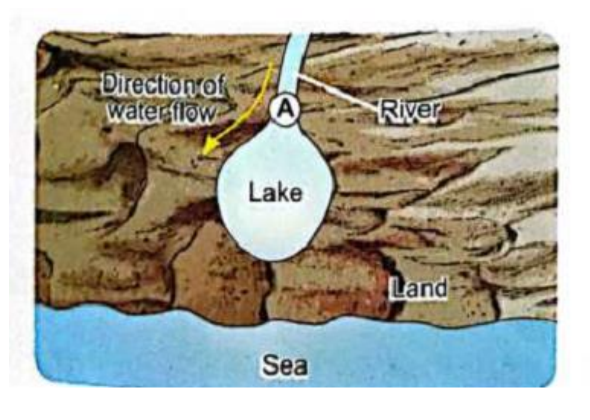
Note

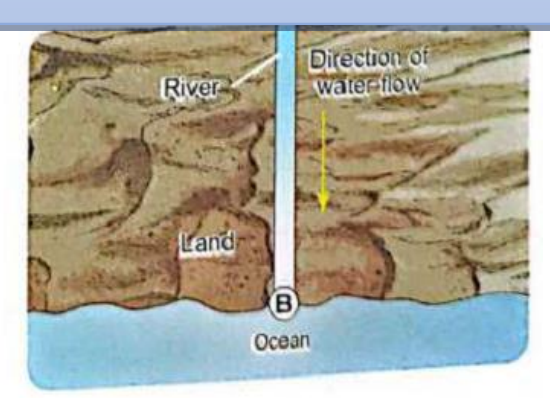
Silt is made of very **fine bits** of **sand**, **clay** or **rock** materials
يتكون الطمي من قطع رفيعة جدًا من الرمل أو الطين أو المواد الصخرية

Most deltas are formed when **fast flowing water** enters **slower moving** water or still water such as
تتشكل معظم مناطق الدلتا عندما تدخل المياه المتدفقة بسرعة المياه بطيئة الحركة أو المياه الساكنة مثل

A delta can be formed
at area A as the river (fast flowing water) enters the lake (still water)
يمكن تتكون دلتا في المنطقة أ حيث يدخل النهر (المياه سريعة التدفق) إلى البحيرة (المياه الساكنة)

A delta can be formed
at area Bas the river (fast flowing water) enters the ocean (slower flowing water)
يمكن تشكيل دلتا في المنطقة حيث يدخل النهر (المياه سريعة التدفق) إلى المحيط (تدفق المياه أبطأ).





Notes

1-Large wetlands are formed in deltas تتكون الأراضي الرطبة الكبيرة في مناطق الدلتا

2. Plants that grow in the wetlands found in deltas increase deposition process because

-Plants are partly responsible for slowing down the river water

-Roots of plants help in trapping sediments

2.النباتات التي تنمو في الأراضي الرطبة الموجودة في مناطق الدلتا تزيد من عملية الترسيب بسبب –

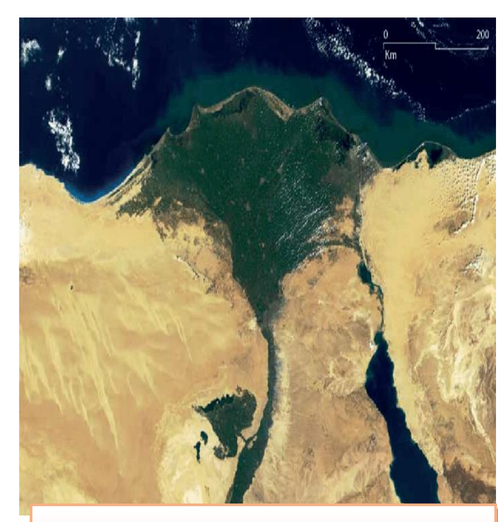
-النباتات مسؤولة جزئيًا عن إبطاء مياه النهر -تساعد جذور النباتات في حبس الرواسب

The Nile River Delta

The most famous deltas in the world is the Nile River Delta

The Nile River Delta has a triangular shape and it lies between Cairo and the northern coast of Egypt

It was formed in Egypt as a result of the rapid flow of the Nile River, which travels a distance of about 6,600 kilometers to pour into the Mediterranean Sea



The Nile River Delta

دلتا نهر النيل من أشهر مناطق الدلتا في العالم دلتا نهر النيل دلتا نهر النيل لها شكل مثلث وتقع بين القاهرة والساحل الشمالي لمصر تكونت في مصر نتيجة التدفق السريع لنهر النيل ، الذي يقطع مسافة حوالي 6600 كيلومتر ليصب في البحر الأبيض المتوسط

It covers over 20,000 square km in Egypt,

and it is characterized by the presence of fertile soil that allows the cultivation (planting) of different types of crops

تبلغ مساحتها أكثر من 20000 كيلومتر مربع في مصر ، وتتميز بوجود تربة خصبة تسمح بزراعة (زراعة) أنواع مختلفة من المحاصيل

Check your understanding Put (√) or (X)

1-Deltas are formed by erosion processes ( )

2-Deltas are formed when the speed of river water increases ( )

Exercises on Lesson (3)

1-Choose the correct answer?

1-The main different between valleys and canyons is that valleys have …… .

a. many rocks layers *b. steep slope walls*
c. gently sloped sides *d. vertical walls*

2-Walls of canyons are characterized by all the following, except that they

a. are gently sloped *b. are very high*
c. have great depth *d. consist of many rock layers*

3- When the speed of the water stream that is run over a mountain increases the rate of erosion

a. increase *b.be constant* *c. decrease* *d. become slower*

4-Deltas are formed when the speed of river water

a. increases *b. decreases* *c. doesn't change* *d. become faster*

5-The delta is formed when the river stream entering all of the following except

a. a lake *b. a sea* *c. a mountain* *d. an ocean*

6-Nile River Delta is characterized by the presence of………. that allows the planting of different types of crops

a. mountains *b. sand dunes* *c. polluted soil* *d. fertile soil*

2-Put (√) or (X)

1-Both canyons and valleys often have river in their bottom (…)
2-The walls of valleys are vertical and steep . (…)
3-Deltas are formed as a result of silt deposition (…)
4-The Nile River pour its water in the Red Sea. (…) .
5. Nile River Delta has a rectangular shape (…)

3-Write the scientific term of each of the following

1-They are lowland areas in between mountains and have gently sloped sides around rivers (………………..…)
2-A land area that is formed by deposition process when a river enters a lake . or a sea (………………..…)

4-Complete the following sentences by using the words below

(sand-speed-deposition-rivers - canyon-silt)

1-Both of valleys and canyons often have………… or streams flow through their lowest points
2-Deltas are formed when the……….. of the river water decreases, which causes deposition of sediment
3-The plants of wetland and their roots cause increase of the rate of………….. process
4-When the sides of a valley become steep, this valley may be changed into a…….
5-Fast flow rivers carry sediments which called………… and it is made of very fine bits of………….. clay or rock materials

5 :Give reasons for

.2-Plants of wetland areas help in formation of deltas . ………… ………… …………
5-*Because they help in increasing the rate of deposition process*

6- What happens if A river stream enters a sea ……… *A delta may be formed*

LESSON 4

Activity 9 Wind Erosion التعرية بالرياح

Put (√) or (X)

1-The movement of wind can form different landforms over years. ( )
2. Erosion and deposition processes can create some landforms ( )

Wind also can be a powerful force of change, where
Wind in desert can change the shape of rocks by erosion.
الرياح أيضا يمكن أن تكون قوة تغيير قوية ، حيث يمكن للرياح في الصحراء أن تغير شكل الصخور عن طريق التعرية.

Wind erosion

When wind blows across the land, it picks up sand and other rock particles and carries them along
عندما تهب الرياح عبر الأرض ، فإنها تلتقط الرمال وجزيئات الصخور الأخرى وتحملها على طول



When this flying sediment hits a rock, it wears down that rock
عندما تصطدم هذه الرواسب المتطايرة بصخرة ، فإنها تتآكل أسفل تلك الصخرة

This process carves the rock into different shapes
هذه العملية تحفر الصخور إلى أشكال مختلفة

Some landforms are created by erosion and deposition process at the same time as sand dunes
بعض التضاريس تتكون عن طريق عملية التعرية والترسب في نفس الوقت مثل الكثبان الرملية

Sand dunes الكثبان الرملية



are made of windblown sand when something like rock blocks the wind
عبارة تتكون من الرمال التي تهب عليها الرياح عندما يسد شيء مثل الصخور الرياح.

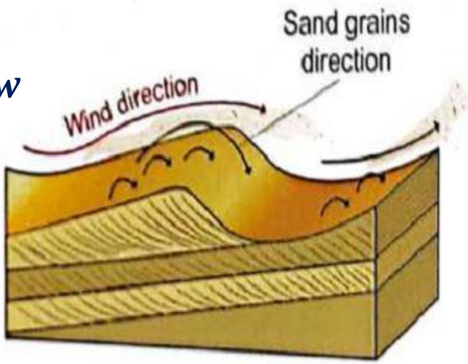
Sand dunes *are common landforms between beach and sandy desert environments.*
Sand dunes usually seen in groups, and they may cover a large area
.Sand dunes can be hundreds of meters tall



الكثبان الرملية هي تضاريس شائعة بين الشاطئ والبيئات الصحراوية الرملية. عادة ما تظهر الكثبان الرملية في مجموعات ، وقد تغطي مساحة كبيرة.
يمكن أن يصل ارتفاع الكثبان الرملية إلى مئات الأمتار.

Sand dunes movement

Sand dunes are continuously moving as follow

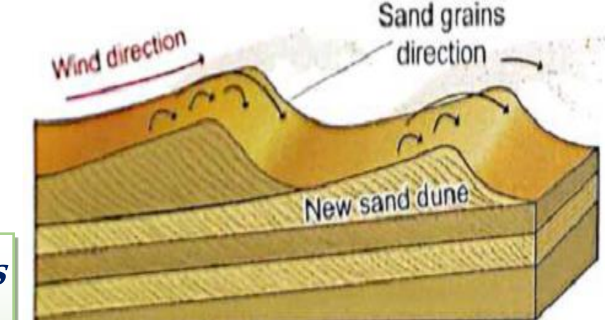


When wind blows across a dune, sand grains erode away from the side that wind is coming from

عندما تهب الرياح عبر الكثبان الرملية ، تتآكل حبيبات الرمل بعيدًا عن الجانب لذي تأتي منه الرياح

The sand grains carried by the wind are collected along the slope of the dune.

يتم جمع حبيبات الرمل التي تحملها الرياح على طول منحدر الكثبان الرملية.



When the sand reach the top, the dune forms a barrier to the wind, and then the sand grains roll down the other side

عندما تصل الرمال إلى القمة ، تشكل الكثبان حاجزًا أمام الرياح ، ثم تتدحرج حبيبات الرمل على الجانب الآخر

Generally الخلاصة

We can conclude that water and wind can change landscapes (such as canyons, mountains, dunes... etc.) over time, where
-Running water can wear away the sides of a river or stream -
-Wind can break down rocks

يمكننا أن نستنتج أن المياه والرياح يمكن أن تغير المناظر الطبيعية (مثل الوديان والجبال والكثبان الرملية ... إلخ) بمرور الوقت ، أين - يمكن أن تتسبب المياه الجارية في تآكل جوانب النهر أو المجرى- .الرياح يمكن أن تكسر الصخور-

Check your understanding Complete the following sentences

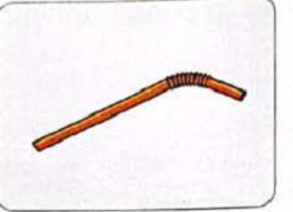
1-Sand dunes are formed by …………...process and deposition process
2-The common landforms between bench and sandy desert environments are ……………

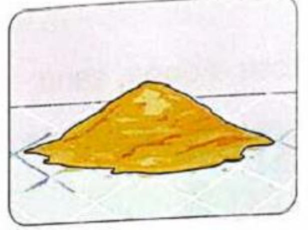
Activity 9 Sand Shifters محولات الرمل

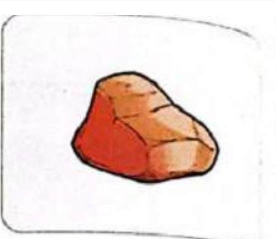
You have learned that sand dunes are formed when wind moves the sand and drops it in a place when something blocks the wind, then wind drops lots of sand in the same place
In this activity we are going to show by a simple experiment how sand dunes are formed and moving

Tools









Aluminum foil pan   Straw   Sand   Small rock

Steps

1-Place a small rock in the pan at one of its sides
2-Put suitable amount the other side of the pan of sand at
3. Use the straw to blow air in front of the sand with a certain direction and small force
4-Repeat the previous step with changing the direction and increasing the force of blowing

1-ضع صخرة صغيرة في المقلاة على أحد جوانبها -2ضع كمية مناسبة من الرمل عليها .3استخدم المصاصة لنفخ الهواء أمام الرمال بإتجاه معين وبقوة صغيرة -4كرر الخطوة السابقة بتغيير الاتجاه وزيادة قوة النفخ



Observations



1-When blowing the air with a small force, sand travels a short distance, and by increasing the force of air blowing, sand travels a longer distance
2-When the air blows at the same direction of the small rock, sand is blocked and collected in front of the rock

1 - عند نفخ الهواء بقوة صغيرة تتحرك الرمال لمسافة قصيرة ، وبزيادة قوة نفخ الهواء تنتقل الرمال مسافة أطول
2-عندما ينفخ الهواء في نفس اتجاه الصخرة الصغيرة ، تسد الرمال وتتجمع أمام الصخرة

Conclusions

1-The wind moves the sand, where
-The distance that the sand travels depends on the force of the wind
-The way that the sand moves depends on the direction of the wind -
2. The dunes are often formed when something blocks the path of sand, as rocks

1-الريح تحرك الرمال حيث -المسافة التي تقطعها الرمال تعتمد على قوة الرياح -الطريقة التي تتحرك بها الرمال تعتمد على اتجاه الريح
2.غالبًا ما تتشكل الكثبان عندما يسد شيء ما طريق الرمال مثل الصخور

Check your understanding Choose the correct answer

1-When the force of wind increases, the distance the sand travels

.a. increases   *b. doesn't change*
c. decreases   *d. stays constant*

2- The ……….are formed when something block the path of wind carrying sand

a. mountains   *b. valleys*   *c. sand dunes*   *d. rivers*

Exercises on Lesson (4)

1-Choose the correct answer?

1- The process of carving the rock into different shapes by wind blowing is .

a. deposition b. erosion c. transportation d. weathering

2-Sand dunes are formed by the effect of both…….. processes

a. mechanical weathering and deposition b. erosion and weathering
c. erosion and deposition d. chemical weathering and erosion

3-When the force of wind blowing……… the sand travels for a longer distance

a. decreases b. becomes zero c. doesn't change d. increases

4-Formation of sand dunes depends on ……… of the wind blowing

a. force only b. direction only
c. both force and direction d. neither force nor direction

5-Sand dunes are common landforms between……… environments

a. beach and rainforest b. beach and sandy desert and oceans
c. rainforest and sandy desert d. sandy desert

6. When a rock blocks the path of flying sand, a……………… may be formed

a. dune b. river c. valley d. canyon

2-Put (√) or (X)

1- Wind can pick up sand grains in forming sand dunes (…)
2- Sand dunes are the landform that can be seen in both beach and sandy desert (…)
3- Sand dunes are formed by erosion only (…)
4- Sand travels for a short distance when wind blows with a great force. (…) .
5. Sand dunes usually seen separately, and may cover a small area (…)
6. Wind cannot break down rocks (…)

3-Write the scientific term of each of the following

1- It is the process by which the wind carves the rocks into different shapes (………………..…)
2- It is the landform that is formed by erosion and deposition of sand in sandy desert environment (………………..…)

4-Complete the following sentences by using the words below

(direction- wind- rocks- decreases – hundreds)

1-Wind erosion can carve the………… into different forms
2-Sand dunes are in continuous motion due to the movement of………………..
3-When the force of wind ……………the sand can't travel for a long distance
4-Sand dunes may reach …………of meters tall
5-Sand can move forward or backward depending on the…………. of wind

5-Give a reason for: A sand dune may be formed in front a large rock in desert

………………………………………… Due to large rock block the path of wind

6-What happens if Wind that is carrying sand particles hits a big rock

……………………………………………………………………………………

2- Sand dune may be formed